Item 11
Wetland Assessment and Mapping

Tobi Tyler, WRCE
Lahontan Regional Water Quality Control Board
July 9, 2015

Tools in Our Toolbox for Protecting and Restoring Wetlands

- California Rapid Assessment Method (CRAM) for condition assessment
- EcoAtlas for the map of wetlands and other aquatic resources
- Benefits and Utility of EcoAtlas in San Francisco Bay Region past 10 years

2011 and 2012 CRAM Trainings

Where are the aquatic resources and how are they doing?

EcoAtlas

About EcoAtlas

California EcoAtlas provides access to information for effective wetland management. The maps and tools can be used to create a complete picture of aquatic resources in the landscape by integrating stream and wetland maps, restoration information, and monitoring results with land use, transportation, and other information important to the state's wetlands.

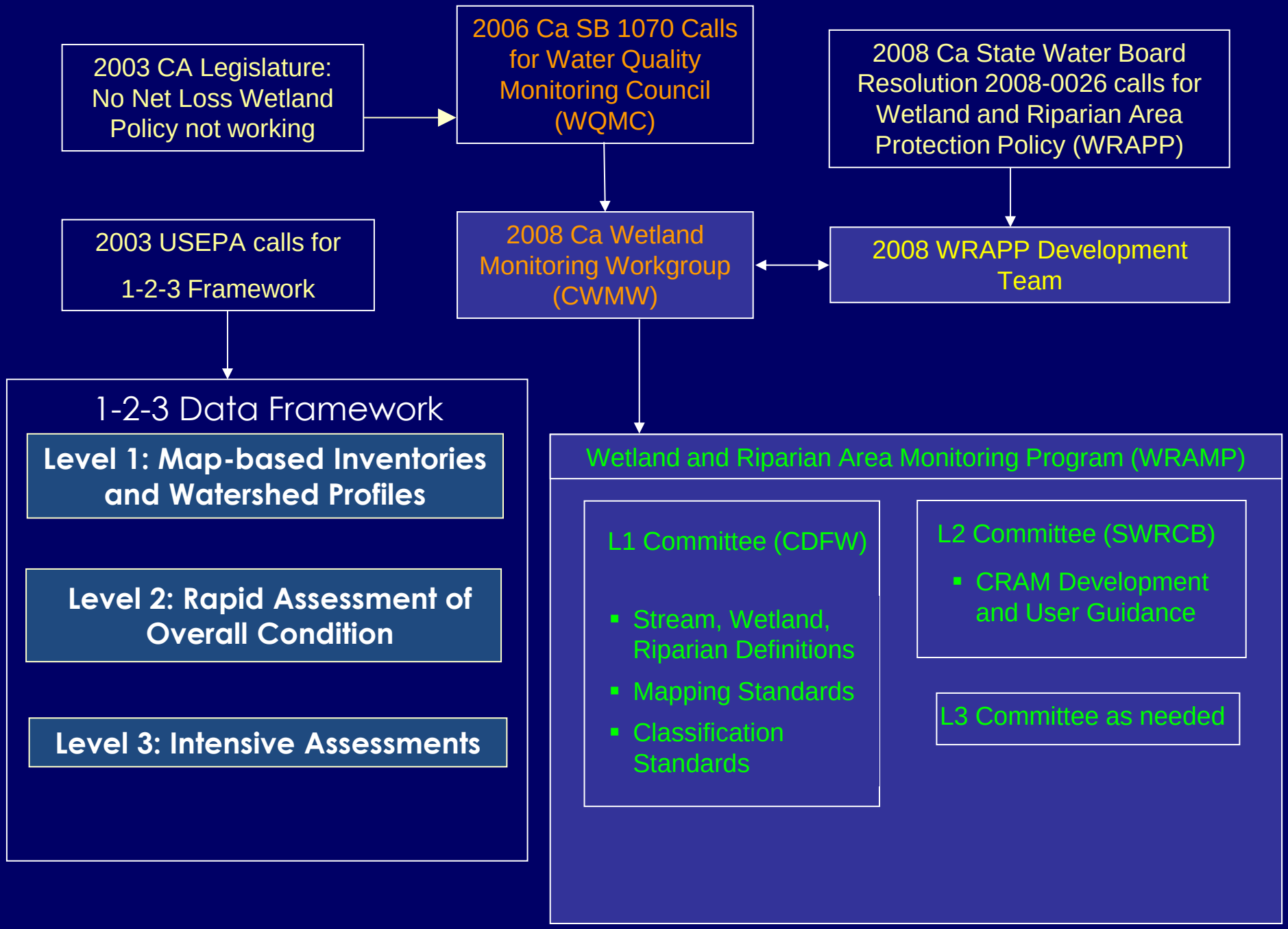
- **Projects:** Restoration project maps, plans, contact information, and a library of project files.
- **Resource Extent:** Maps of aquatic resource extent and special habitats of interest.
- **Condition:** Assessment and monitoring data including relevant water quality and California Rapid Assessment Method (CRAM) data.

Statewide

Map Projects Summaries

Ecoregions | Water Board Regions

- Klamath/North Coast
- Bay/Delta
- Central Coast
- Modoc
- South Coast
- Sierra
- Sacramento Valley
- Mojave
- San Joaquin Valley
- Colorado Desert


2003 CA Legislature: No Net Loss Wetland Policy not working
2006 Ca SB 1070 Calls for Water Quality Monitoring Council (WQMC)
2008 Ca State Water Board Resolution 2008-0026 calls for Wetland and Riparian Area Protection Policy (WRAPP)
2003 USEPA calls for 1-2-3 Framework
2008 Ca Wetland Monitoring Workgroup (CWMW)
2008 WRAPP Development Team
1-2-3 Data Framework
Level 1: Map-based Inventories and Watershed Profiles
Level 2: Rapid Assessment of Overall Condition
Level 3: Intensive Assessments
Wetland and Riparian Area Monitoring Program (WRAMP)
L1 Committee (CDFW)
Stream, Wetland, Riparian Definitions
Mapping Standards
Classification Standards
L2 Committee (SWRCB)
CRAM Development and User Guidance
L3 Committee as needed

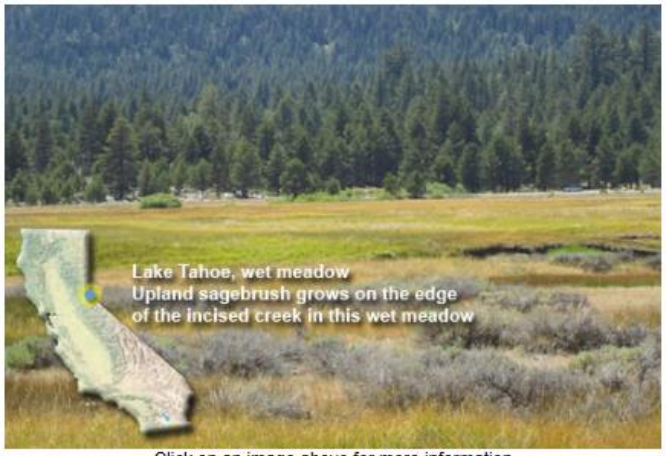
Office of Governor
Edmund G. Brown Jr.
Visit his Website

- Cal/EPA
- Natural Resources Agency
- About the California Water Quality Monitoring Council

WETLANDS

- Stressors
- Laws, Regulations & Standards
- Regulatory Activities
- Enforcement Actions
- Research
- Monitoring Programs, Data Sources & Reports

California Wetlands



Click on an image above for more information

7/9

Wetlands have both aquatic and terrestrial characteristics. Wetlands form along the shallow margins of lakes, estuaries, and rivers, and in areas with high groundwater or shallow surface water, such as springs, wet meadows, ponds, and freshwater and tidal marshes. They often go through wet and dry cycles, and therefore support a unique array of life specially adapted to these conditions. Wetlands provide important habitat for birds, fish, and other wildlife. They support local food webs, contribute to flood protection, groundwater recharge, shoreline protection, and water filtration: all important ecosystem services.

California has lost more than 90% of its historical wetlands and today, many remaining wetlands are threatened. Wetlands continue to be drained for agriculture, filled for development, or disturbed by modifications to the watershed such as dams or water diversions. Climate change poses a significant threat, as many wetlands today are dependent on artificial water delivery systems or high groundwater levels, and may be impacted by changing climatic conditions. Further, wetlands along the coast face flooding from potential sea level rise.

Because of their value and vulnerability, wetlands are protected by a series of special laws and permitting requirements. The informational links on this page contain more information about the health and distribution of California's wetlands.

Informational Links

QUESTIONS ANSWERED

What is the extent of our wetlands?

Where did our numbers come from?

- Where are they?
- How much have we lost?
- What types are there?
- How do we classify them?
- What services do they provide?
- What is the status of mapping?

How healthy are our wetlands?

- How do we know how they're doing?
- How do we assess wetland health?
- What studies have documented wetland condition?

How are our wetlands protected?

- What regulations protect them?
- Where are wetlands being restored near me?

Coastal wetlands are disappearing at an alarming rate, despite their importance to ocean and coastal health, humans and the economy. We talk with Megan Cooper, Project Analyst at the State Coastal Conservancy, about how coastal restoration provides benefits to the environment and the economy. Restored

Item 11 (2)
California Rapid Assessment Method for Wetlands
Applications and Real Life Examples

Sarah Pearce, San Francisco Estuary Institute
sarahp@sfei.org




What *is* CRAM?

CRAM is a field-based “walk and talk” diagnostic tool that, when used as directed, provides rapid, repeatable, numeric assessment of the *overall condition* of a wetland based on visible indicators of its form, structure, and setting, relative to the least impacted reference condition.

What is *overall condition?*

Overall condition is the capacity or potential of a wetland to provide the functions and services expected for the same type of wetland in its natural setting, assessed relative to "best" reference condition.

What is *rapid?*

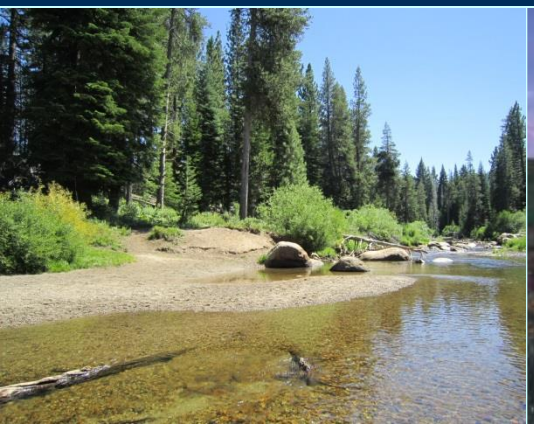
CRAM requires a team of 2-3 trained practitioners less than 3 hours in the field, maximum, to assess a representative wetland area. That's 3 hours from the car to final results.

What CRAM is *NOT*

- CRAM is not a wetland identification or delineation methodology.
- CRAM is not a wetland classification system.
  - CRAM *is* based loosely on the HGM classification system.
- Although CRAM does not directly measure functions, it does measure the capacity for those functions to occur.
  - If the condition is “excellent”, then the functions associated with that condition are presumed to exist.

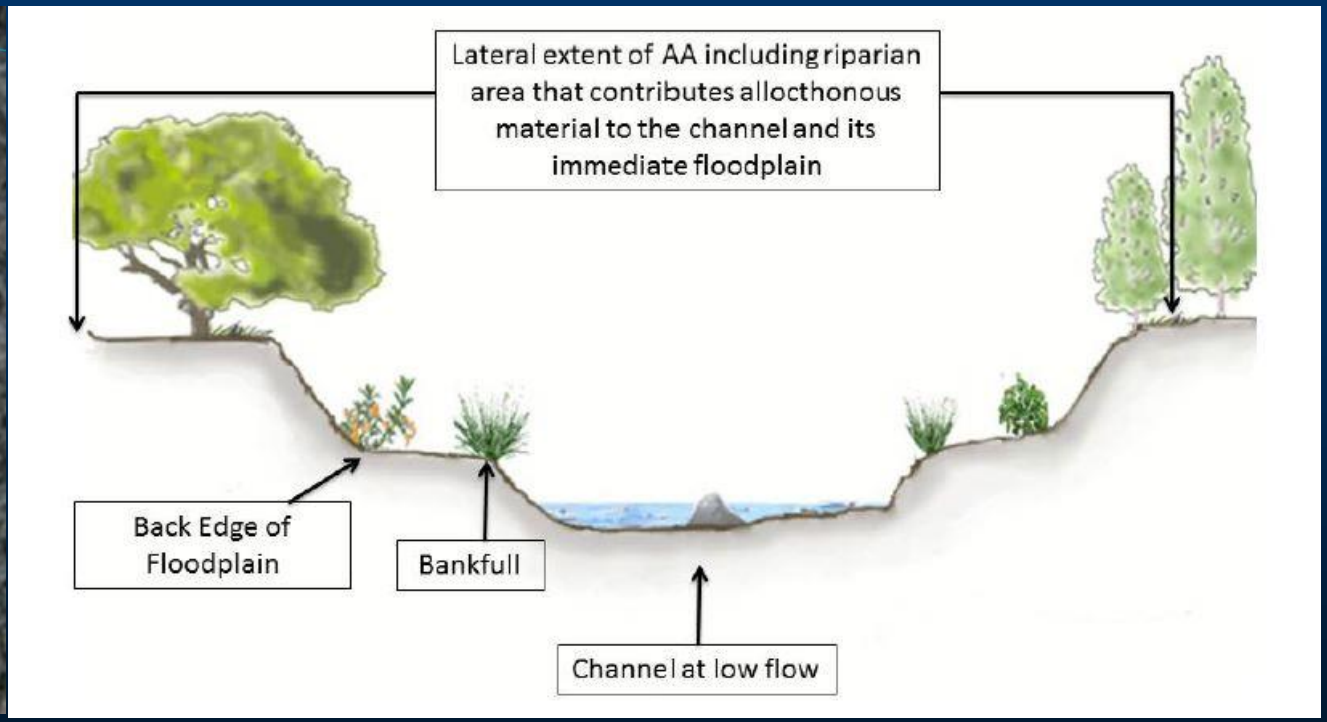
Geographic Scope of CRAM
All Wetlands in California

- Riverine Wetlands
  - Confined and Non-confined
  - Arid
- Depressional Wetlands
  - Vernal Pools
  - Playas
- Lakes
- Estuarine Wetlands
  - Saline and Non-Saline
  - Bar-built (Seasonal)
- Slope Wetlands
  - Wet Meadows
  - Seeps/Springs
  - Forested Slope

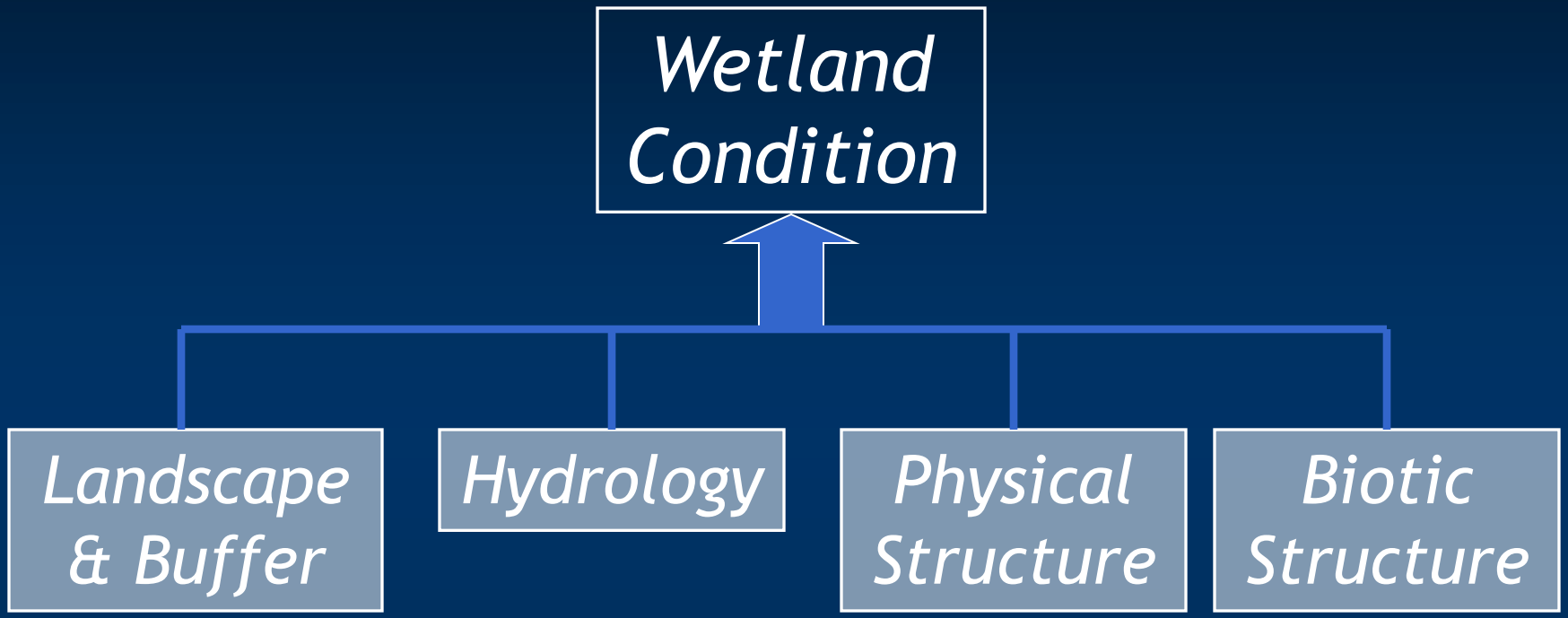


CRAM Design: the Assessment Area

- The Assessment Area (AA) is the portion of the wetland that is assessed using CRAM.

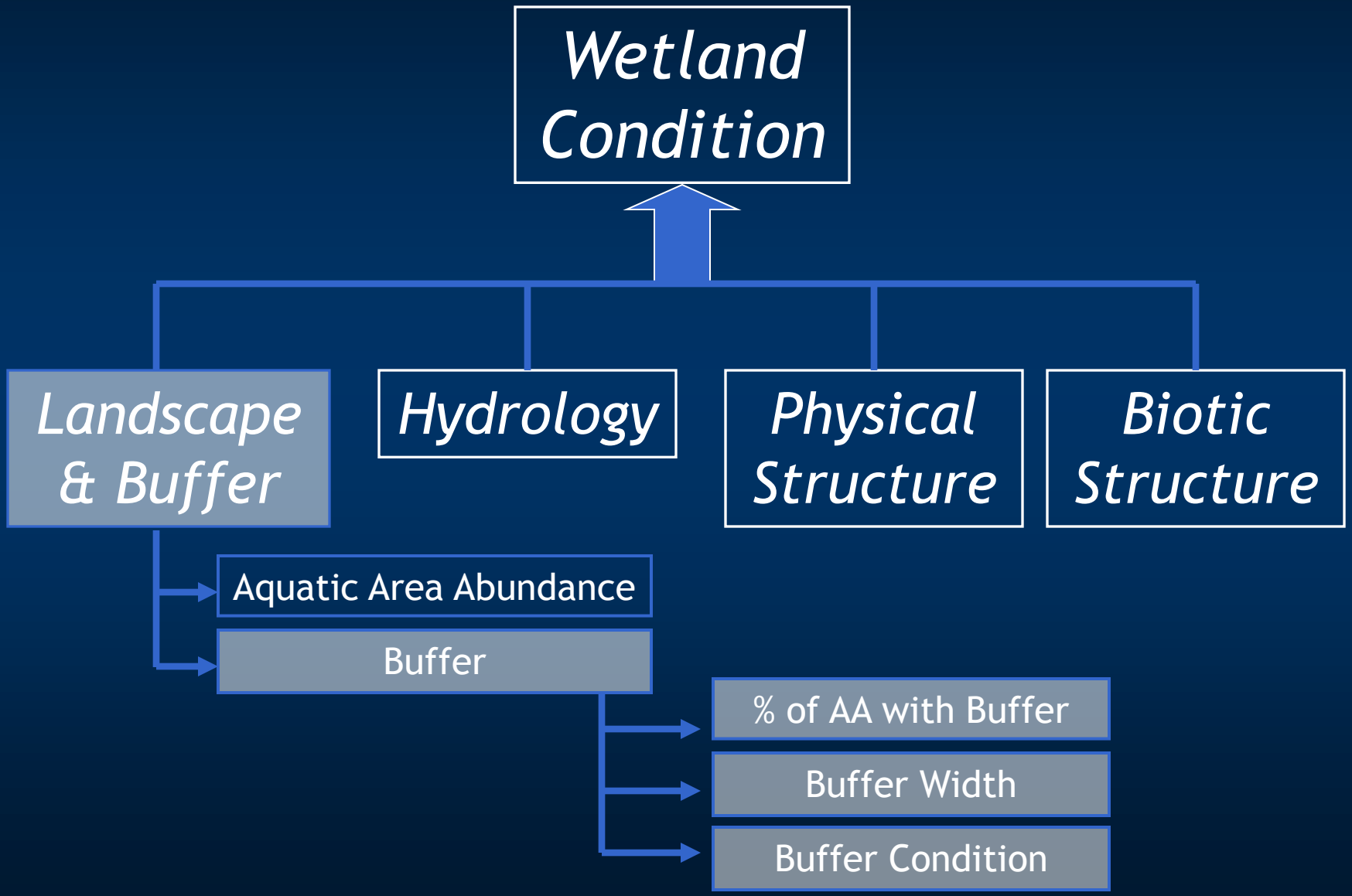


CRAM Design: Attributes



- For all wetland classes, CRAM recognizes 4 *attributes* of wetland condition (consistent across all modules).
- Each attribute is represented by 2-3 *metrics*, some of which have *submetrics* (some differences between modules).

CRAM Design: Submetrics



Submetric Scoring Example

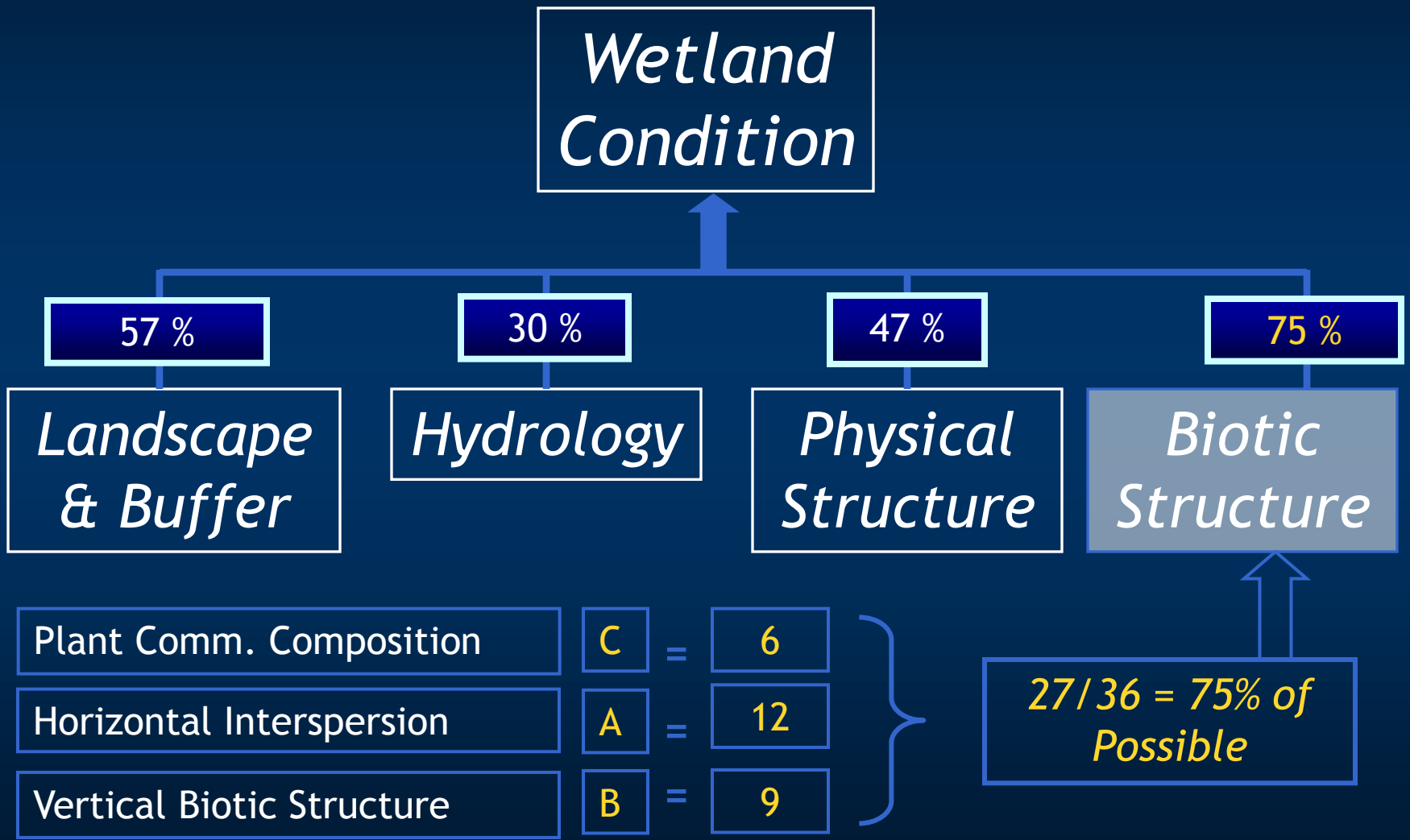
- Mutually exclusive alternative states
- Represent full range of possible condition

Buffer Width

Alphabetic Score	Numeric Score	Alternative State
A	12	Average buffer width 190-250m
B	9	Average buffer width is 130–189m
C	6	Average buffer width is 65–129m
D	3	Average buffer width 0-64m

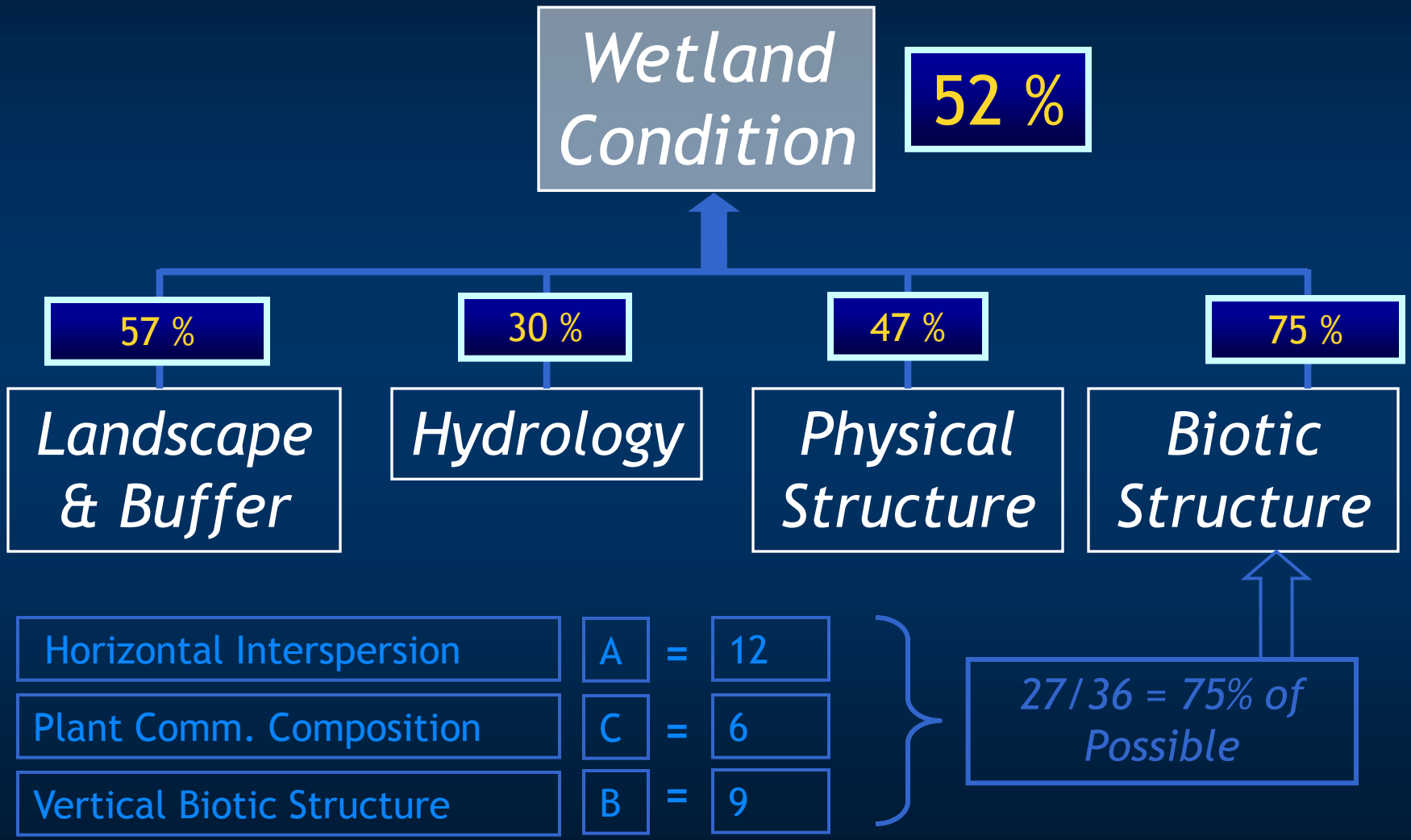
CRAM Scoring:

Percent possible metric score = Attribute score

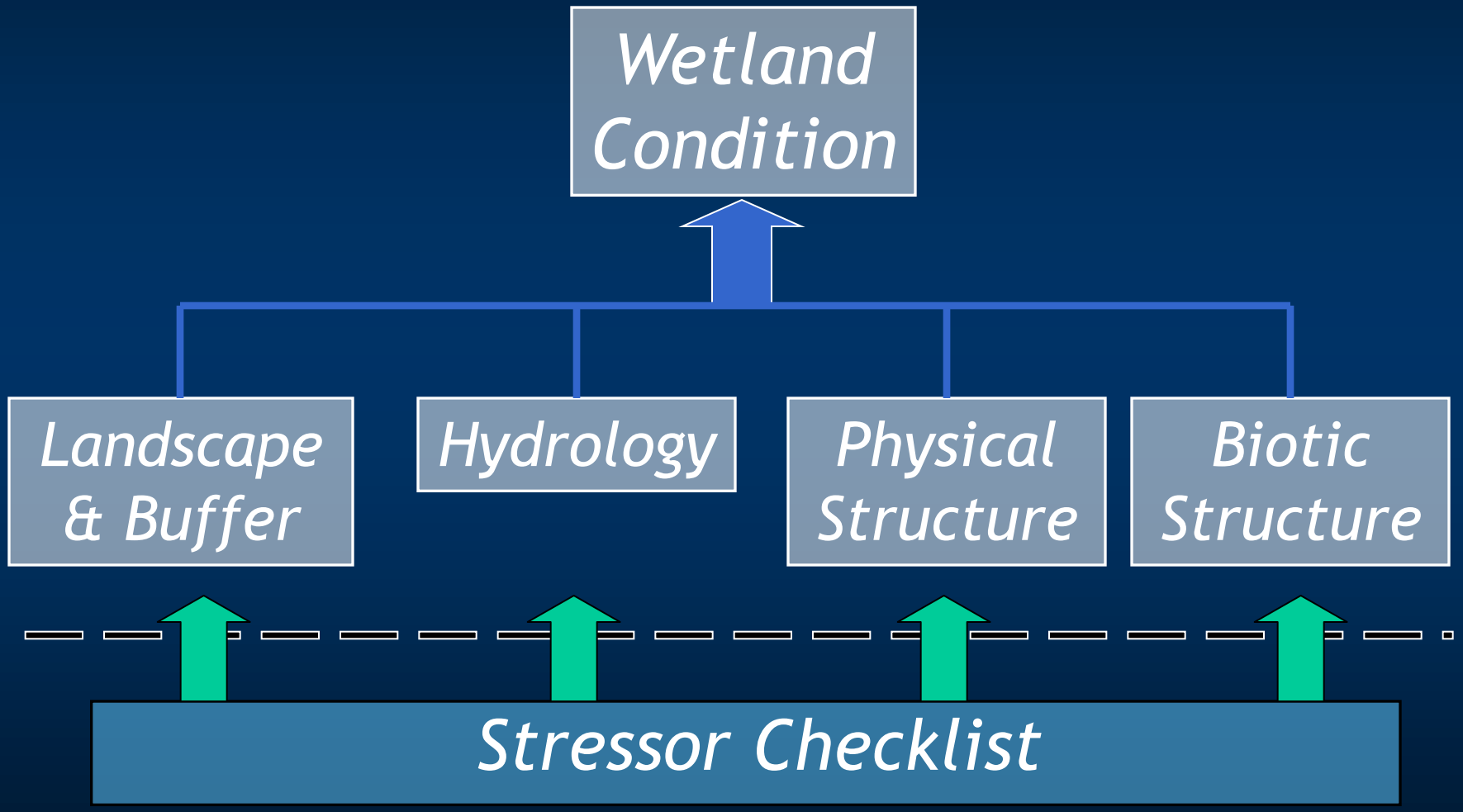


CRAM Scoring:

Average of Attribute scores = Overall score



Stressors are Identified



Uses of the Stressor Checklist

- Identify possible causes for low CRAM scores
- Identify possible corrective actions
- Develop testable hypotheses relating scores to stressors

Index Score Represents Overall Wetland Condition

- The CRAM Index Score combines indicators of all Attributes to represent overall condition, which is related to functional capacity or wetland "health."

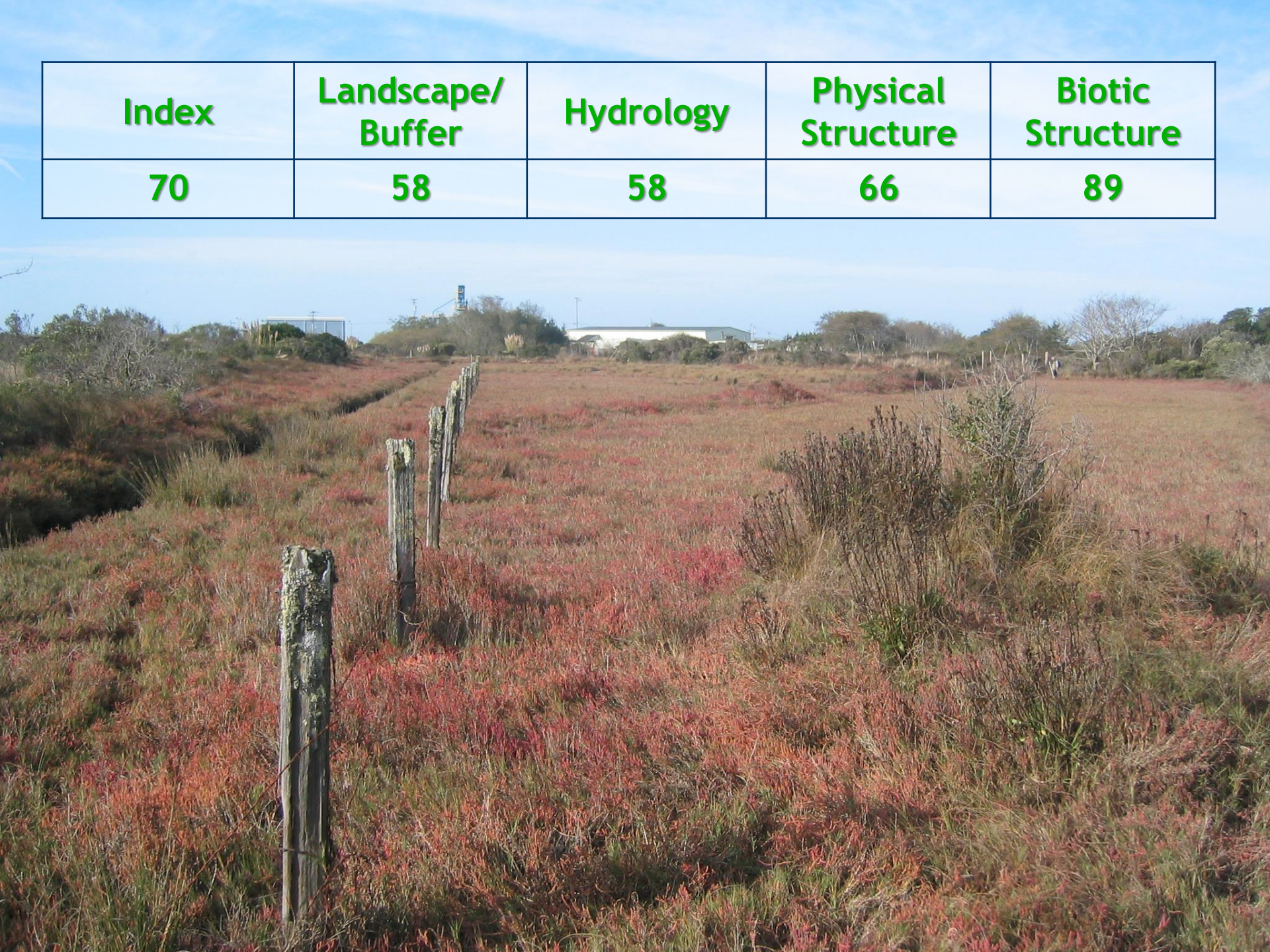
- CRAM Index Scores are analogous to:
  - Apgar Scores (newborn infant health)
  - Dow Jones Industrial Average (DOW)
  - Gross National Product (GNP)
  - Grade Point Average (GPA)

Index Scores Alone Can Be Misleading

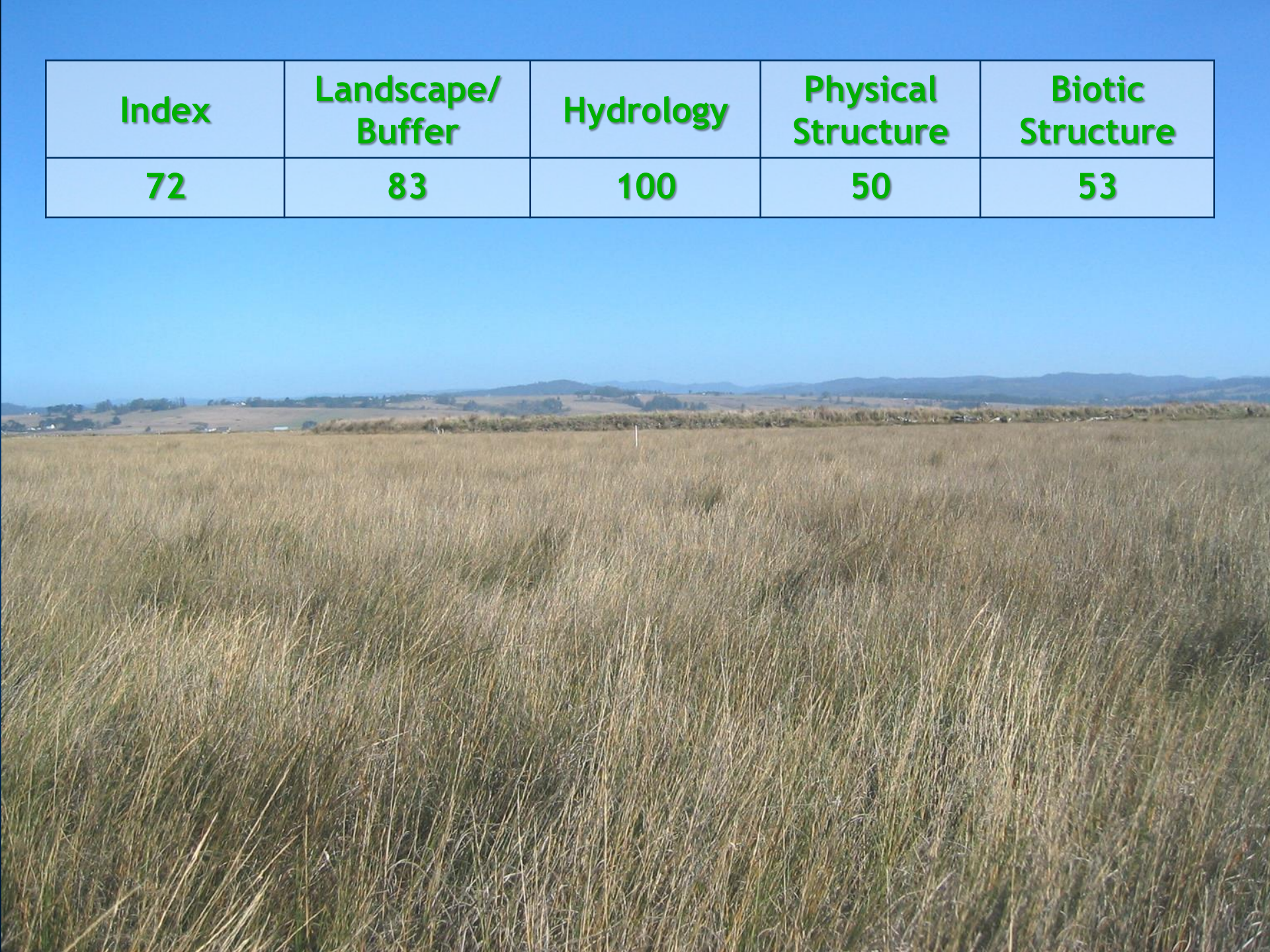
- Identical Index or Overall Scores can be derived from different arrays of Attribute Scores
  - Must refer to Attribute Scores (and sometimes to Metric Scores) to interpret Index Scores

Landscape - Buffer	Hydrology	Physical Structure	Biotic Structure	Index Score
50	65	42	68	56
64	48	37	76	56

Index	Landscape/ Buffer	Hydrology	Physical Structure	Biotic Structure
70	58	58	66	89



Index	Landscape/ Buffer	Hydrology	Physical Structure	Biotic Structure
72	83	100	50	53

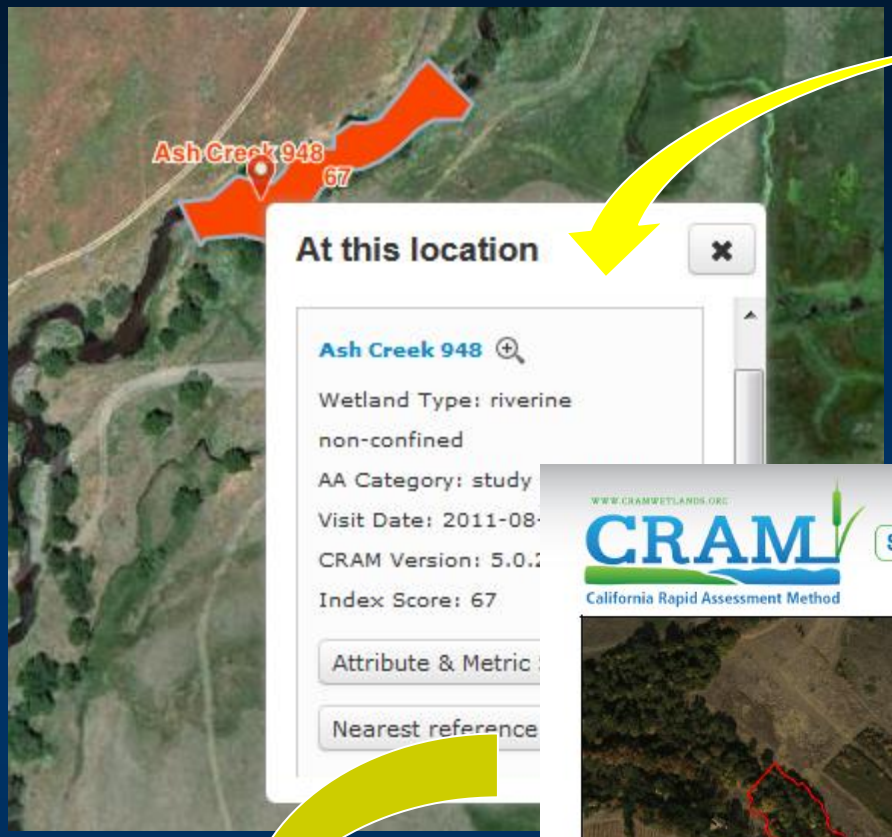


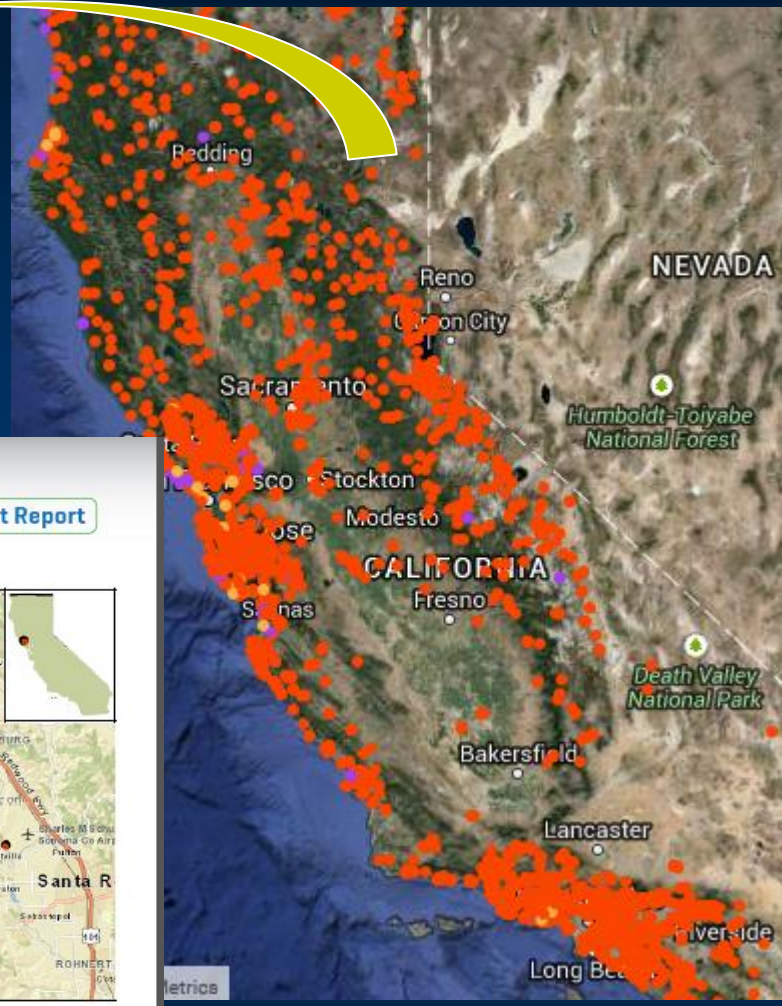
California Rapid Assessment Method

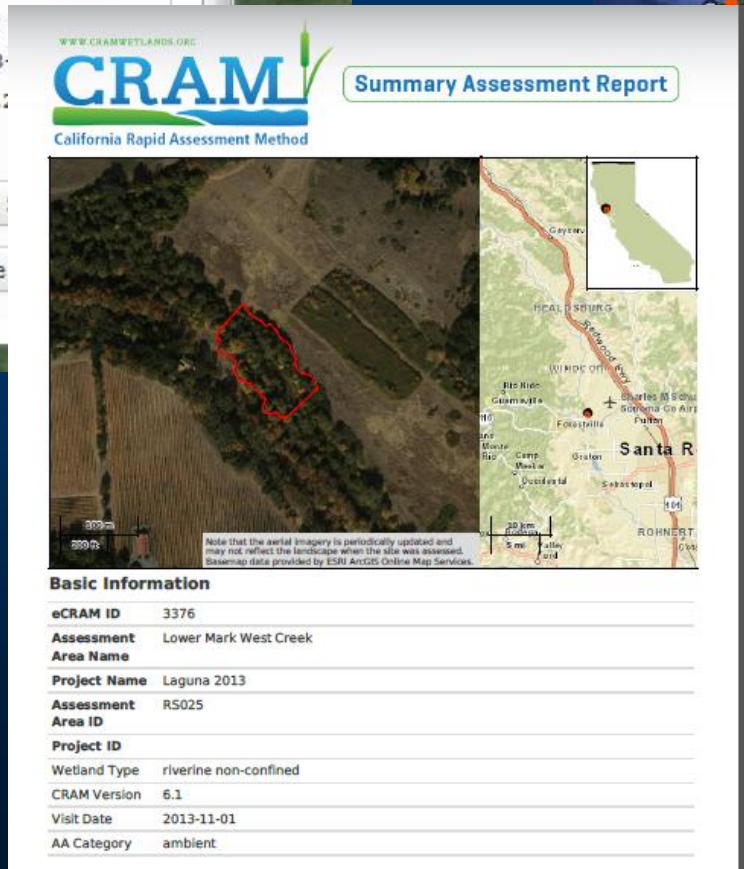
CRAM is a cost-effective and scientifically defensible rapid assessment method for monitoring the conditions of wetlands throughout California. It is designed for assessing ambient conditions within watersheds, regions, and throughout the State. It can also be used to assess the performance of compensatory mitigation projects and restoration projects.

TOTAL ASSESSMENTS	3306	UPCOMING TRAININGS	6	401 PERMITS WITH ASSESSMENTS	9	TRAINED IN CRAM	765

Store, Retrieve, and Visualize Data and Results







cramwetlands.org

Peer Review

- Rapid Assessment in California (Sutula et al. 2006)
- Mitigation project review (Ambrose et al. 2005, 2006)
- USACE ERDC Review (2008)
- CRAM Validation (Stein et al. 2009)
- State Water Board peer review (2009-12)
- SWAMP Endorsement (March 2013)

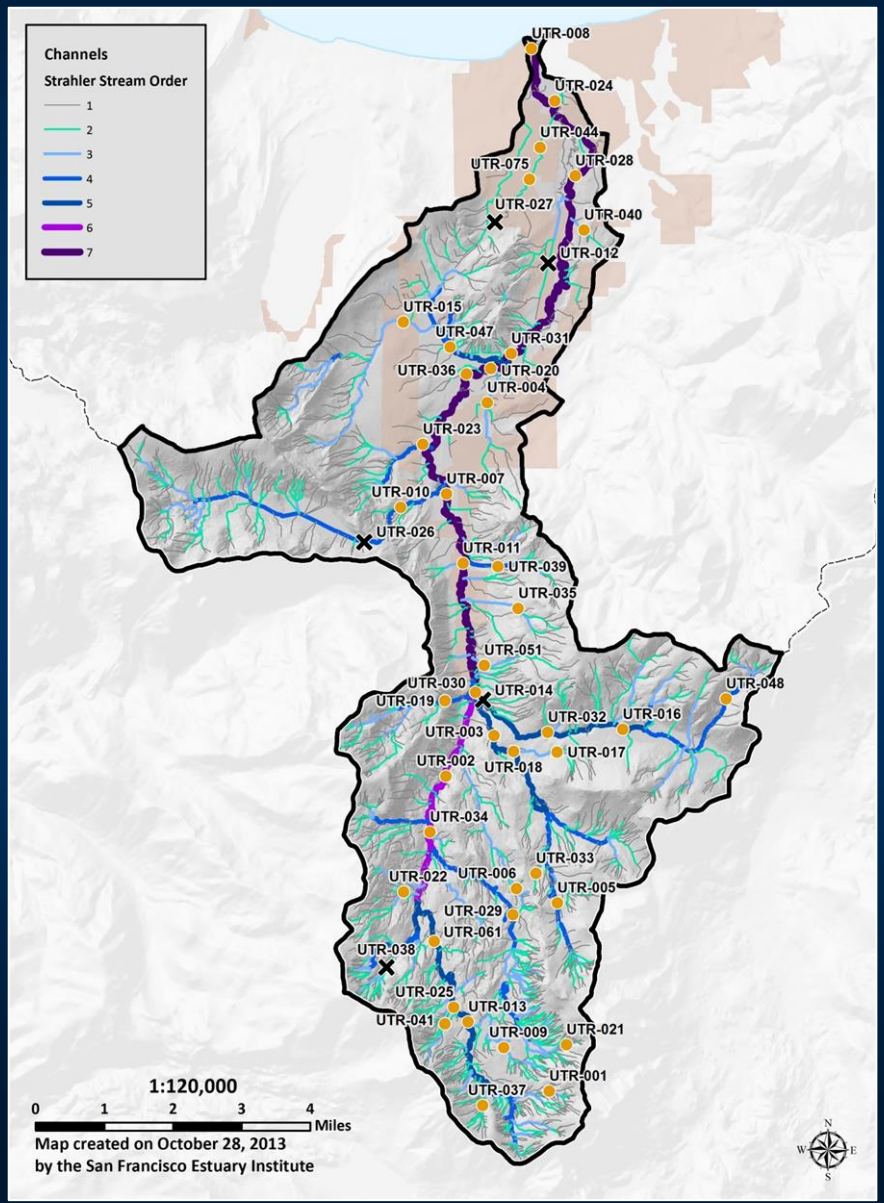
How is CRAM Being Used?

- Ambient Assessments- statewide and watershed scale
- Project Assessments
  - Baseline Conditions
  - Impact Assessment and Alternative Comparison
  - Restoration/Mitigation Planning and Permitting
  - Long-term Monitoring

Ambient Assessment

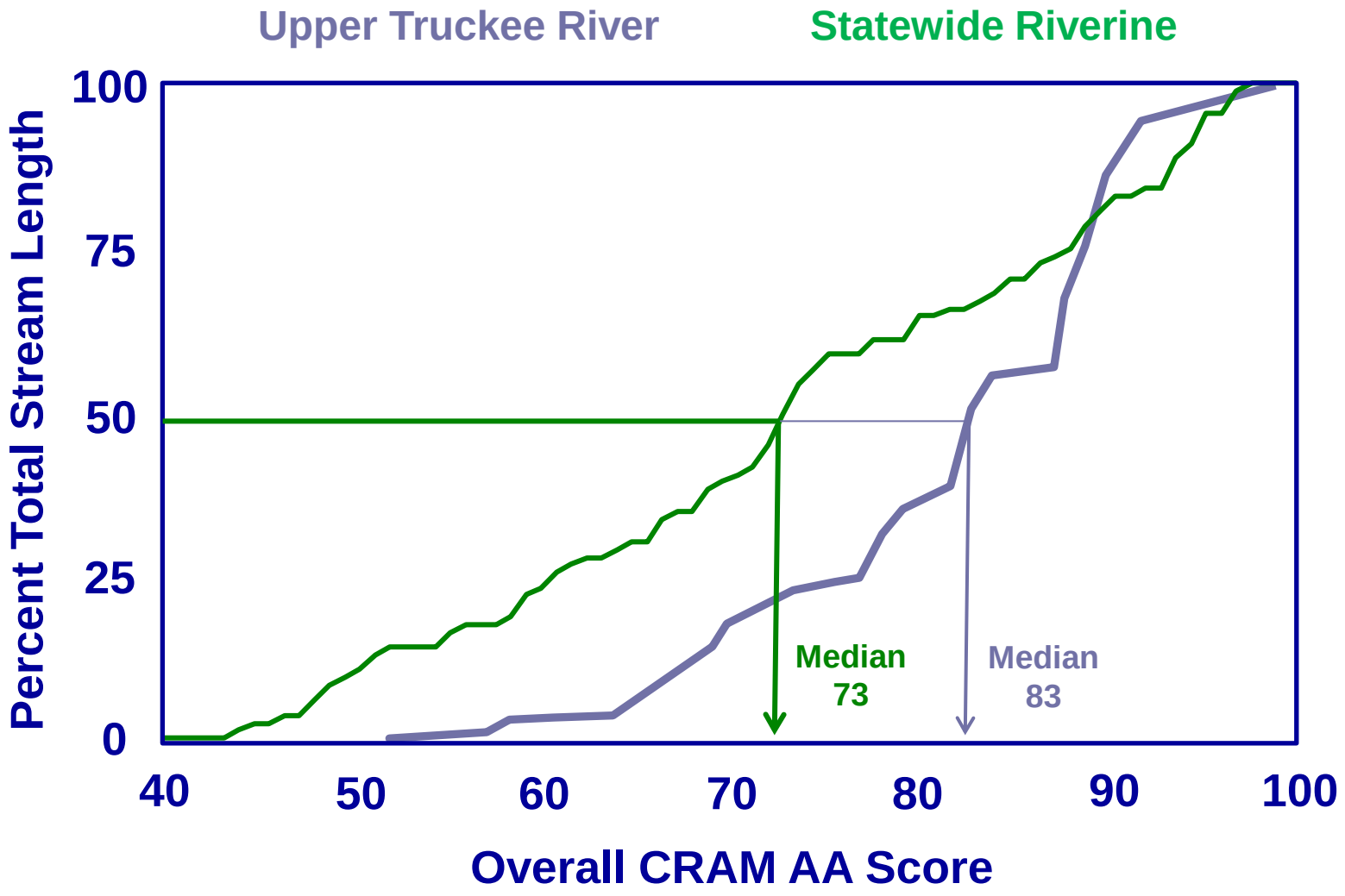
- A probabilistic survey conducted for wetlands in a specific wetland class.
- Requires a “complete” map of all wetlands and a stratified random sampling methodology that relates each sampled point to a wetland area for which the point represents the wetland condition.

Ambient Assessment Example: Upper Truckee River Survey



- Stratified by stream order and by urban vs. non-urban
- 40 sample sites selected using GRTS
- CRAM assessments completed summer 2011 by SFEI staff and local trained practitioners

Comparison to Statewide Condition



Project Assessment

- A structured assessment of wetland condition used to support an application for an approval or permit, an environmental review, an alternatives analysis, a mitigation proposal, or any similar use or action.
- An assessment conducted for monitoring such projects.
- May be conducted by project applicants or by reviewing agencies.

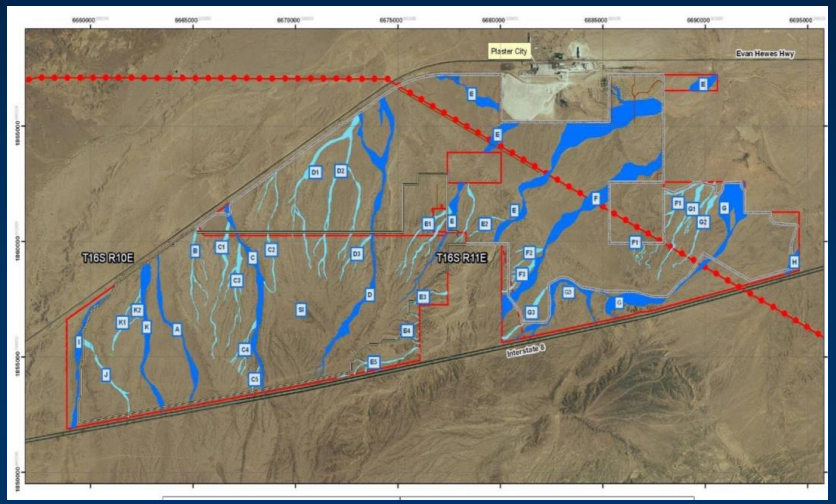
Project-Related Uses of CRAM

- Sampling the full range of wetland condition at an impact site, which can assist with impact identification, avoidance, and minimization.
- Identifying mitigation requirements.
- Identifying reference conditions and reference sites for the project and mitigation sites.
- Characterizing existing condition in aquatic resources proposed for enhancement or rehabilitation.
- Assessing performance of compensatory mitigation projects.

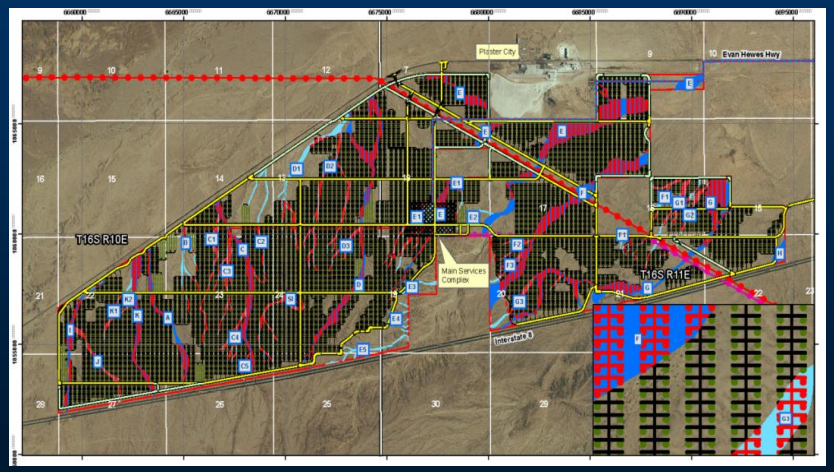
Baseline Condition Example:
Prospect Island Restoration

- DWR and CDFW restoration project, to return tidal action
- Stratified depressional wetlands
- CRAM used to assess current and post-restoration condition
- Baseline condition determined by 18 assessments (6 days of fieldwork), for significant cost savings

Impact Assessment and Alternative Comparison Example: Imperial Valley Solar Project



881 acres of Waters of the U.S.

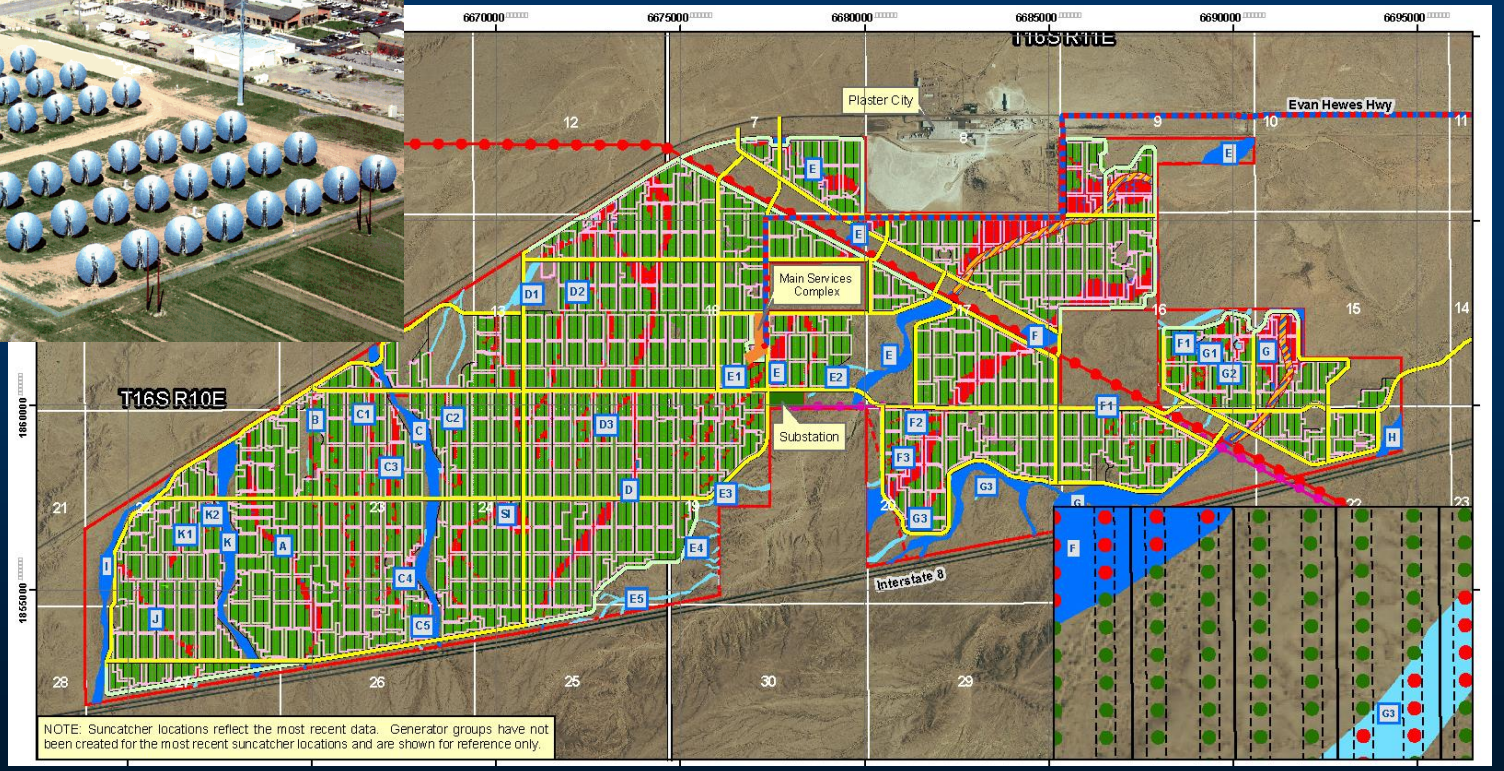


Proposed Project to fill 165 acres

- 84 CRAM AAs
- Data used in 404(b)(1) permitting
- Evaluate baseline stream condition
- Analyze direct and indirect impacts of 6 alternatives
- Redesign alternatives to avoid and minimize
- Identify mitigation need

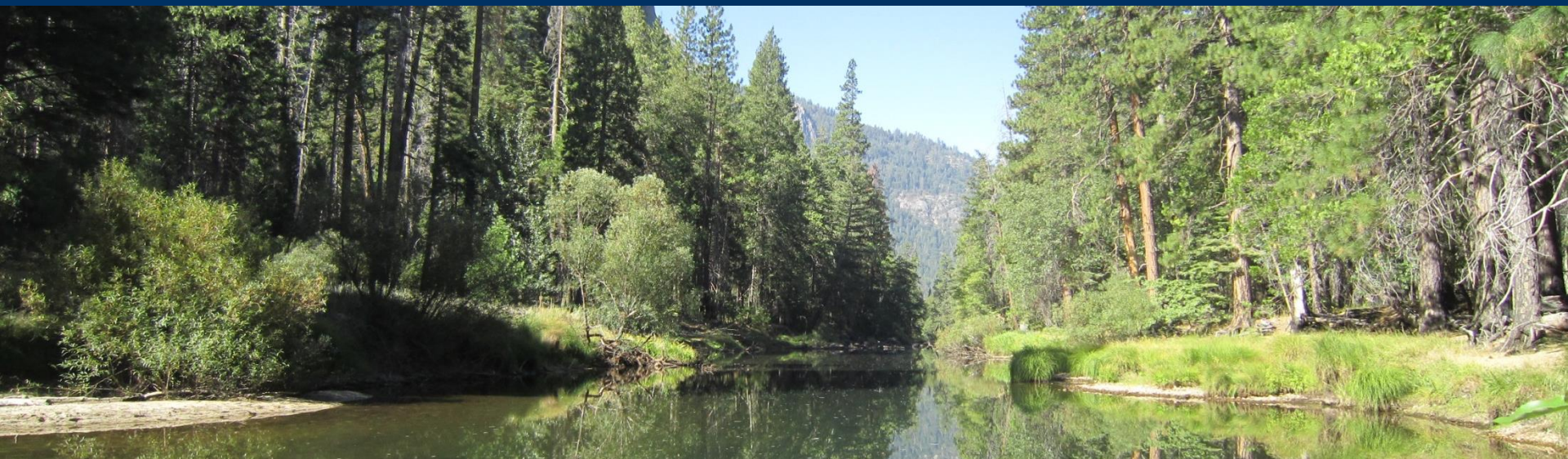
Permitted Project

- Avoidance of high quality primary streams
- Minimization of direct and indirect impacts through reduction of roads, redesign of crossings, and suncatcher layout
- Reduced fill, somewhat reduced energy generating capacity



Long Term Monitoring Example: Merced River Plan

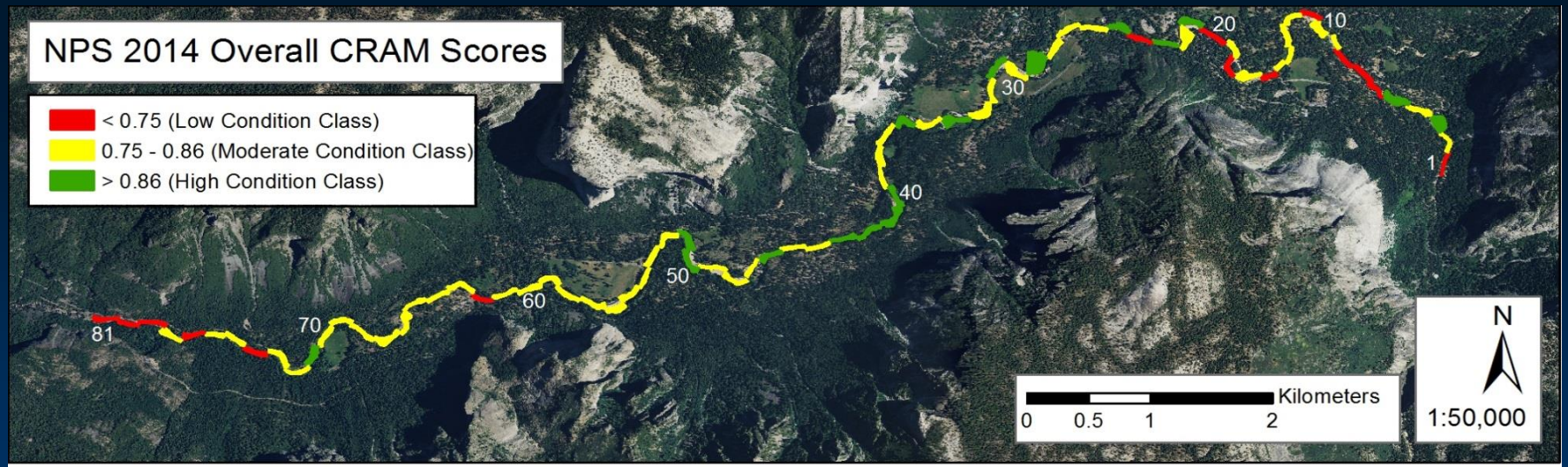
- In 2014 the National Park Service released *The Merced Wild and Scenic River Final Comprehensive Management Plan*, which is the guiding document to protect and enhance river values and manage use in the river corridor for the next 20 years.
- Identifies management objectives, use capacities, and prescribes long-term monitoring to ensure objectives are met.

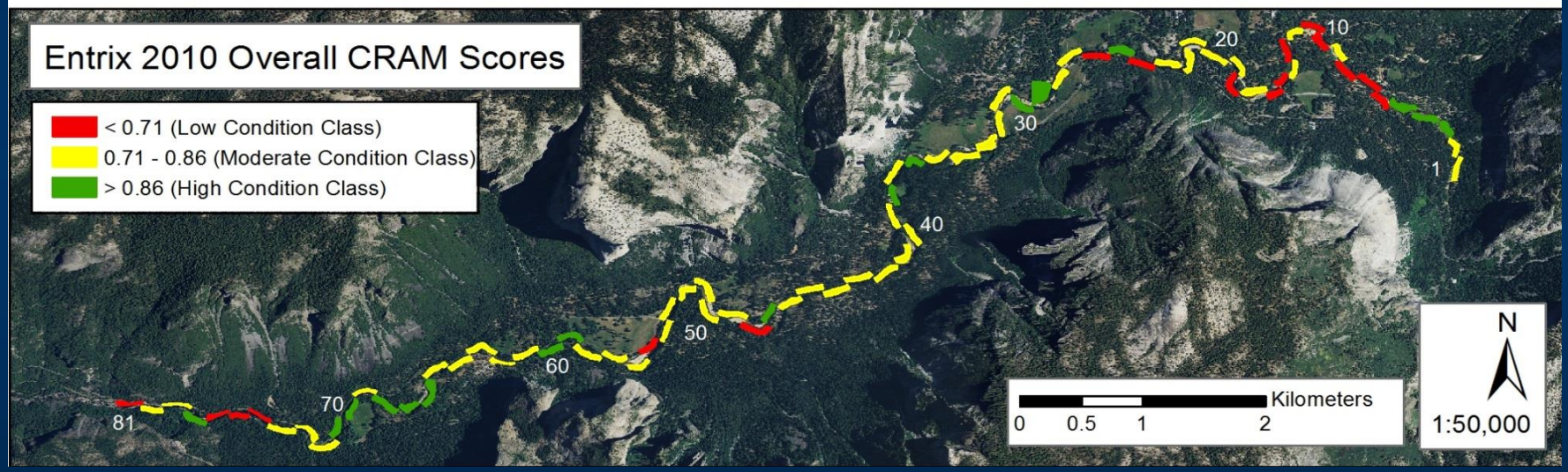


CRAM is prescribed as an indicator to monitor the status of the Riverine and Riparian habitat.

- Objective: comprehensive rapid assessment of river habitat conditions (every 3-5 years), to detect potential visitor use impacts at the incipient stage.

- Thresholds determined based on CRAM scores (2010 and 2014 surveys), where progressively more intensive management actions are taken, if conditions breach trigger points, management standards, or progressive degradation.





- Comparison of 2010 and 2014 scores showed some reaches where condition had improved, and others that are now on the “watch list” for potential degraded condition in the 2017 survey.

One tool in the toolbox

- CRAM scores can assist in watershed-level decision making. Can compare scores through time and space.
- CRAM can characterize patterns among aquatic resources in a project, landscape, watershed or statewide setting.
- CRAM can enhance project or watershed characterization, impact assessment, mitigation planning, and monitoring.
- New applications of CRAM continue to evolve each year.


CRAM GULCH
BRIDGE 2-144L
5 SIS R39 04
Thank you

Item 11 (3)

EcoAtlas

Visualize Abundance, Diversity, and Condition of Wetlands, Streams, and Riparian Areas in the Watershed Context

Cristina Grosso, SFEI-ASC

Lahontan RWCQB Board Meeting
July 9, 2015

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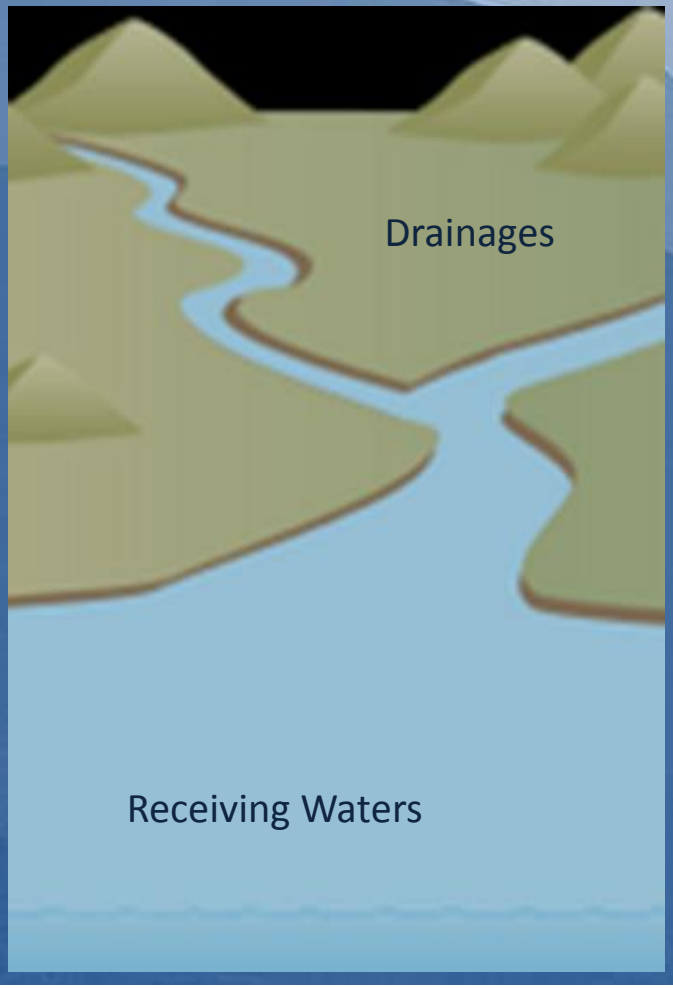
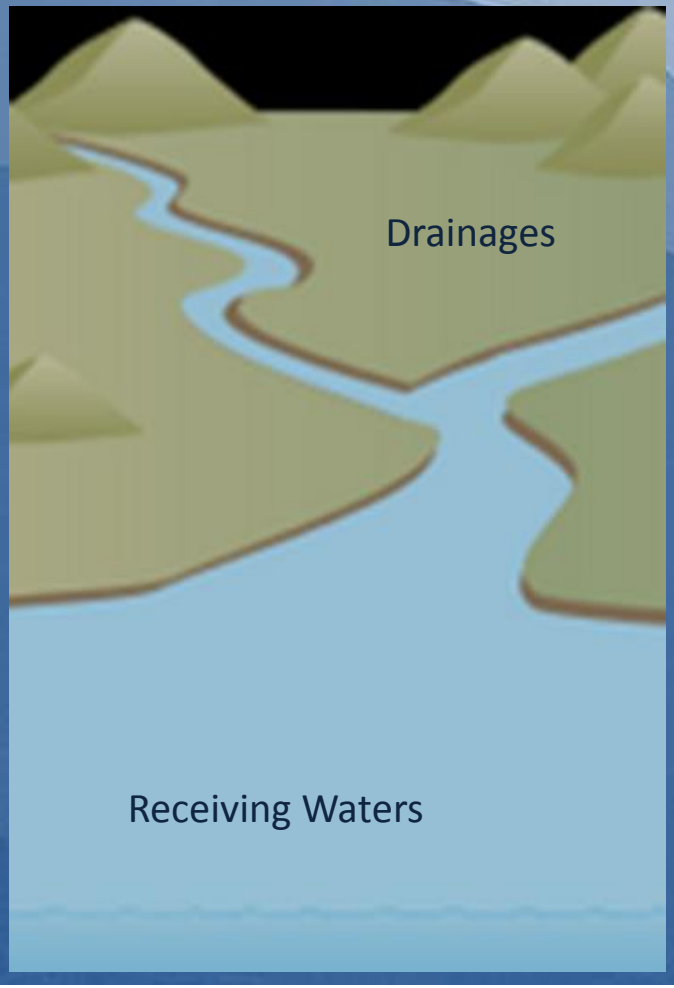
Emerging Toolset



- Flood Control 2.0 Framework
- Stream & Riparian Definitions
- Riparian Buffer Decision Tool (RipZET)
- Sediment Budget Estimator
- LID Optimizer
- Restoration Performance Models
- Transition Zone & Head of Tide Definitions
- Shoreline Change Detector
- Bay & Delta Regional Monitoring Programs
- Nutrient Visualization
- Ecological Resilience Framework
- Compliance & Effectiveness Monitoring Framework
- Historical Ecology
- Flood Infrastructure Mapping
- CA Aquatic Resource Inventory
- Contaminant Load Models
- CA Rapid Assessments Tools
- Project Tracker
- Contaminant Data Display (CD3)
- Landscape Profile Tool
- Regional Data Center
- EcoAtlas
- My Water Quality Portals

Emerging Toolset



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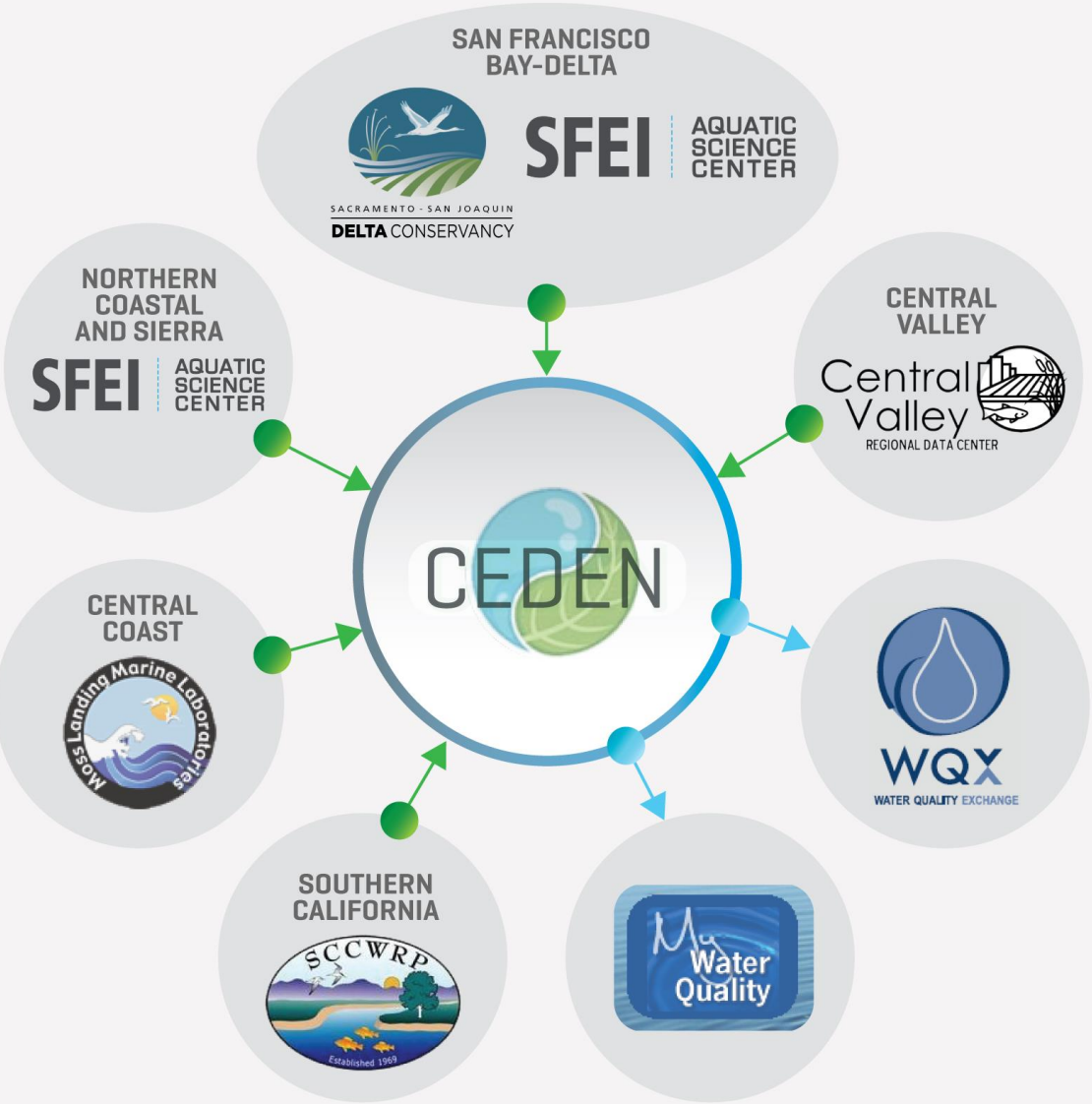
CALIFORNIA REGIONAL DATA CENTERS



Watershed-based Decision Support Tools

- ***Planning*** :: Resource Inventory (CARI, TARI)
- ***Tracking*** :: EcoAtlas Project Tracker, Online 401
- ***Visualization*** :: EcoAtlas, Landscape Profile Tool

Watershed-based Decision Support

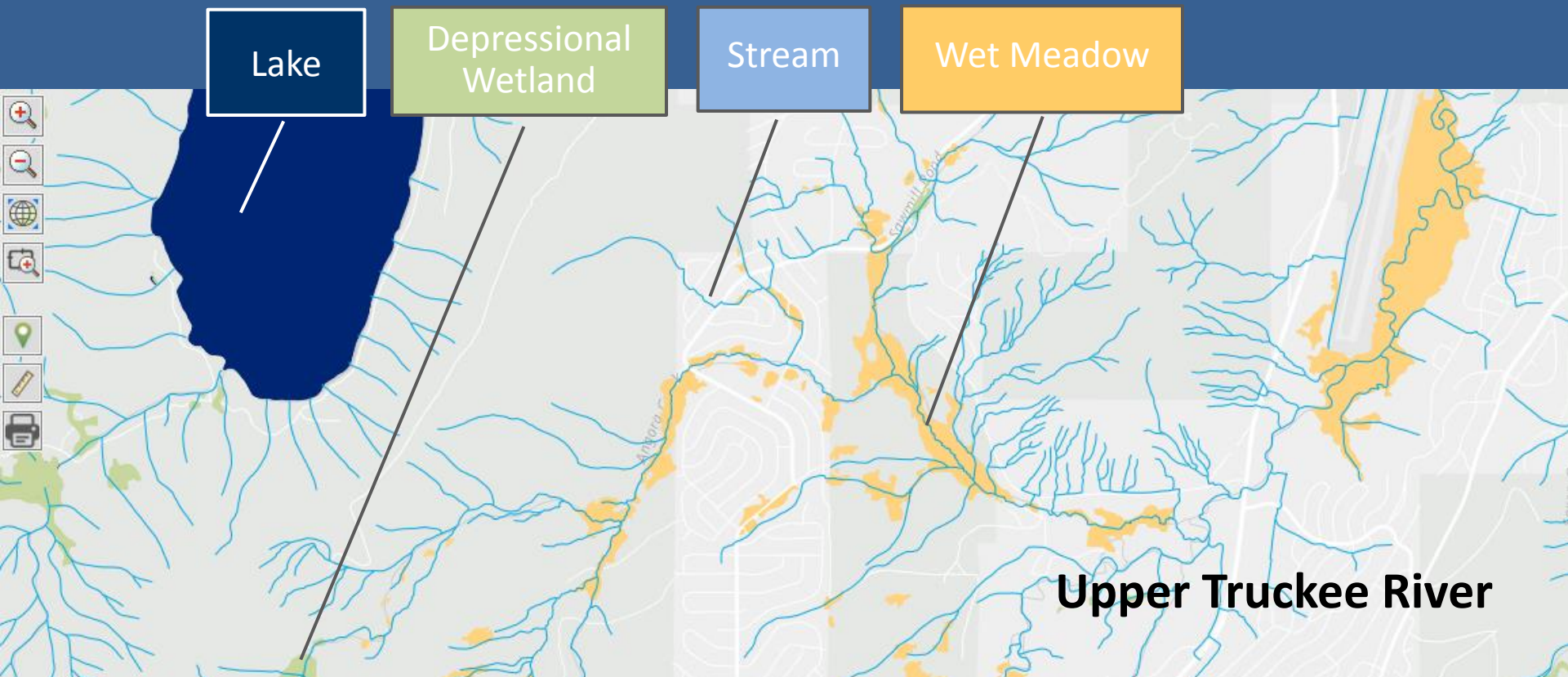
:: Planning Tools

SFEI AQUATIC SCIENCE CENTER

Planning Tool :: Tahoe Aquatic Resource Inventory (TARI)

Purpose

Serves as common base map to coordinate watershed health across Federal, State, and Local agencies



Watershed-based Decision Support

:: Tracking Tools

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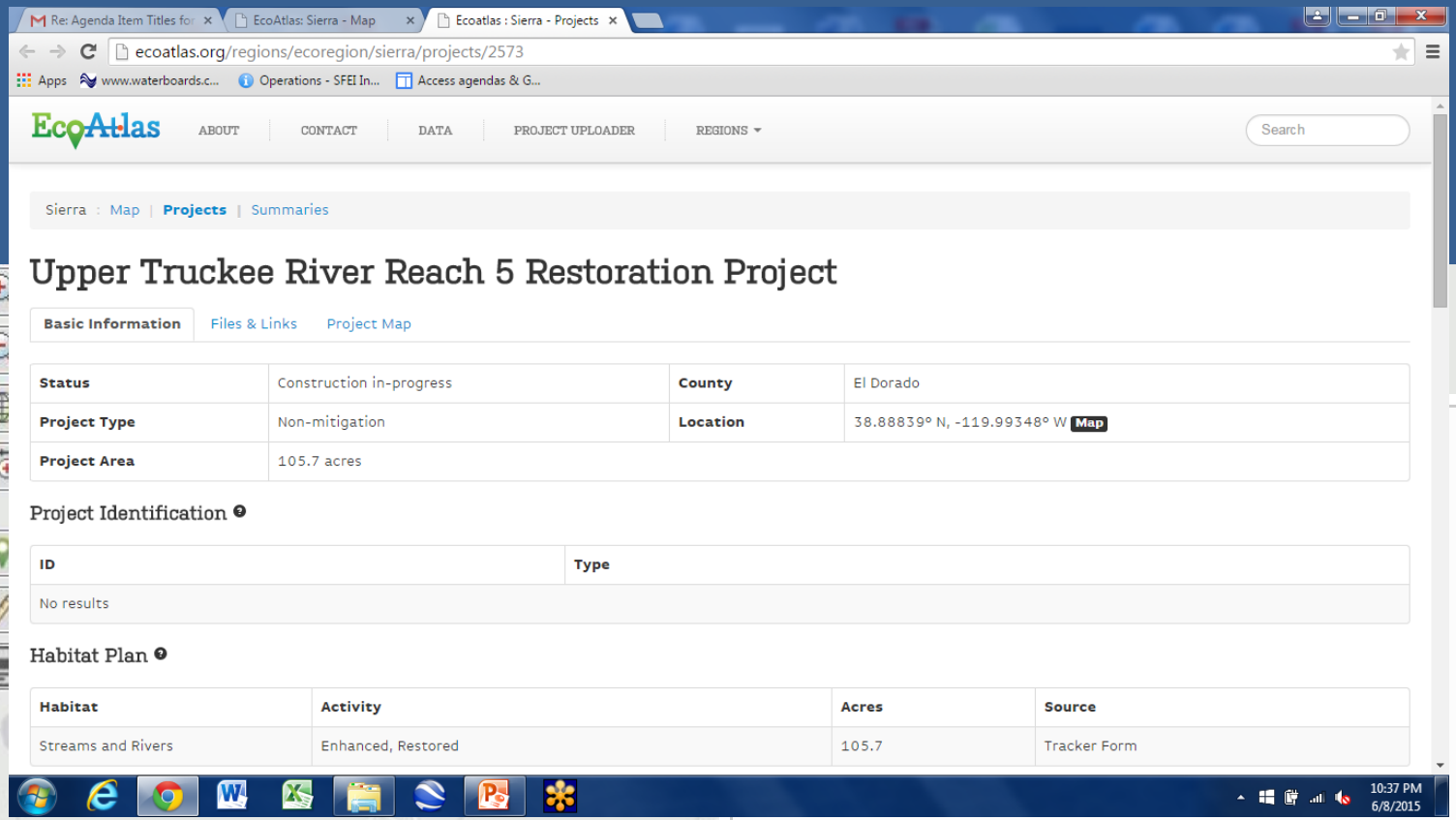
Tracking Tool :: EcoAtlas Project Tracker

Purpose

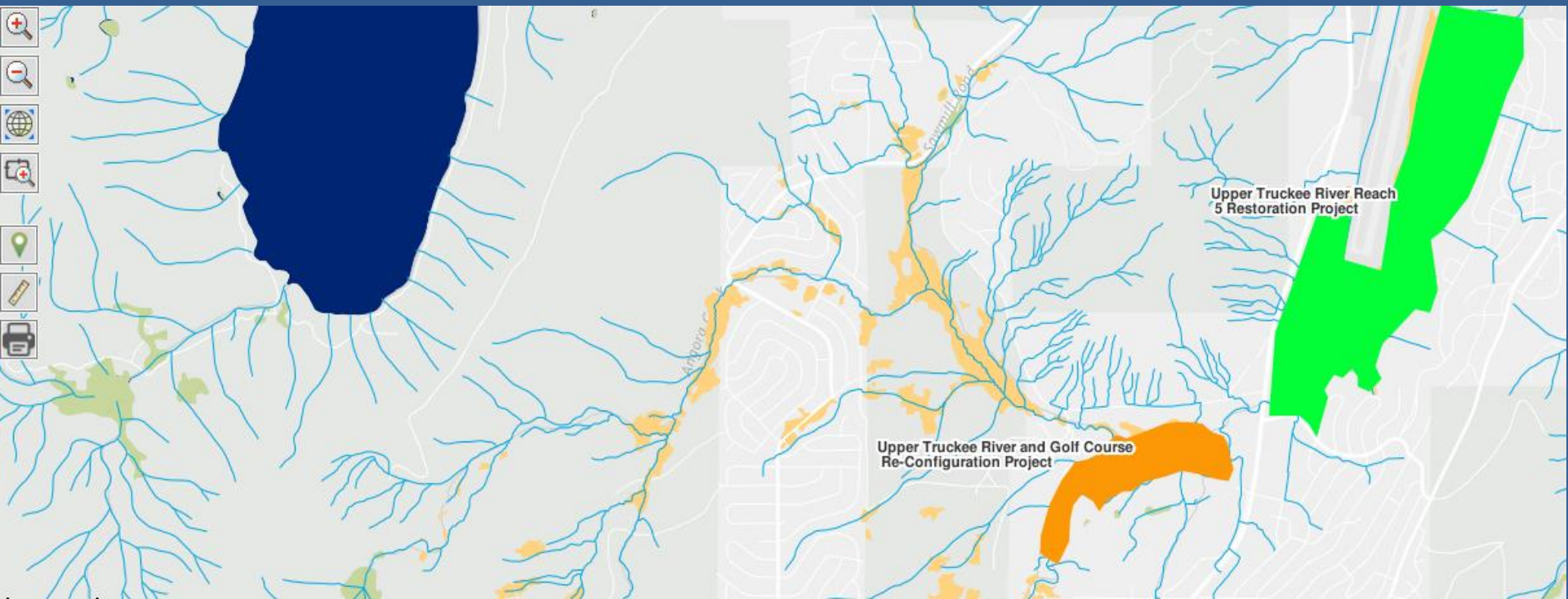
Track project information on a common statewide map



Tracking Tool :: EcoAtlas Project Tracker

Features

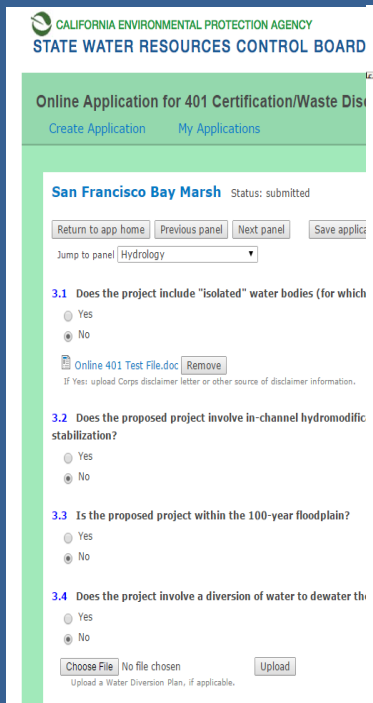
- View maps of projects provided through 401/WDR permits
- View maps of proposed surface waters within projects (CARI)
- Share data and information through project maps
- Perform spatial queries to search maps and lists of projects

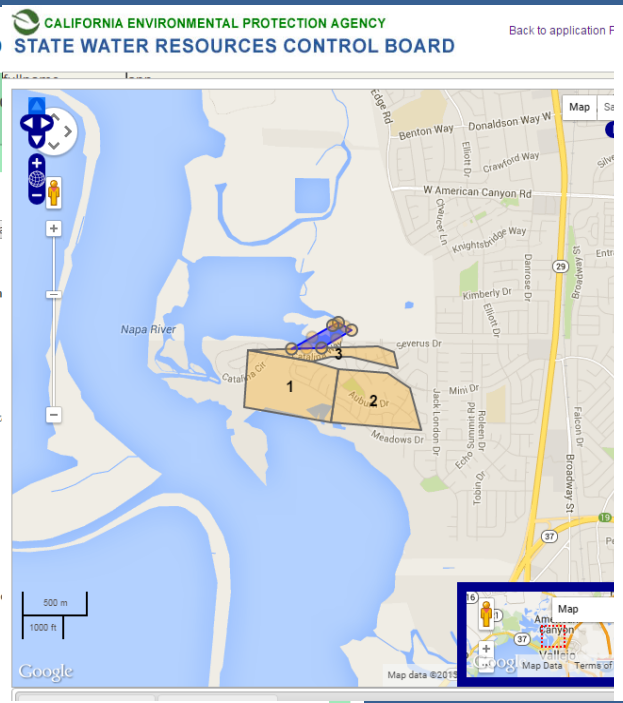


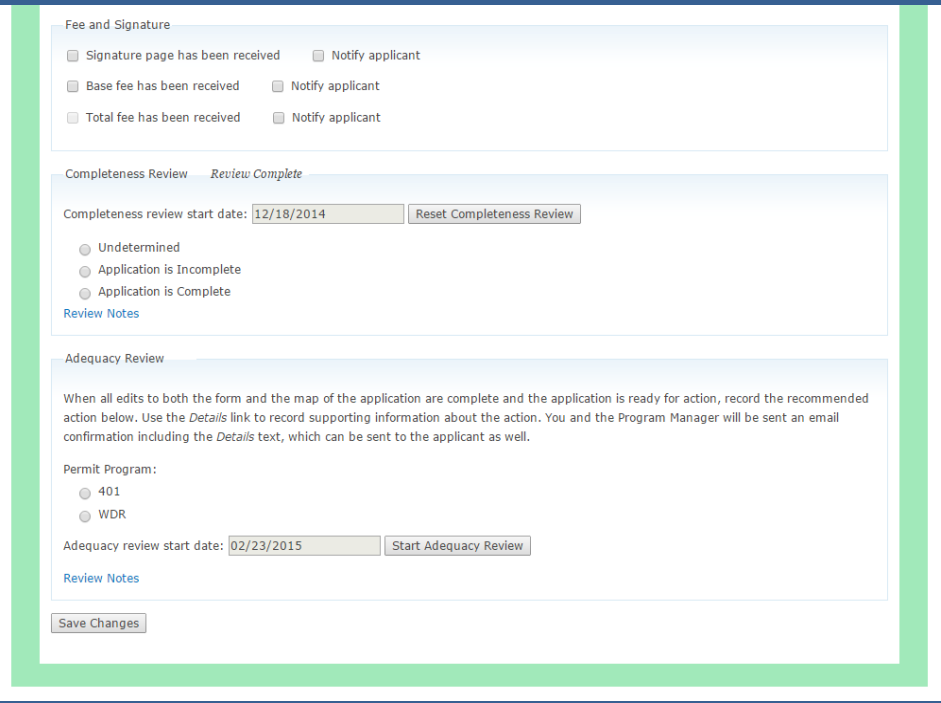
Tracking Tool :: Online 401 Application

Purpose

Track permit negotiation process and deliver an approved certification



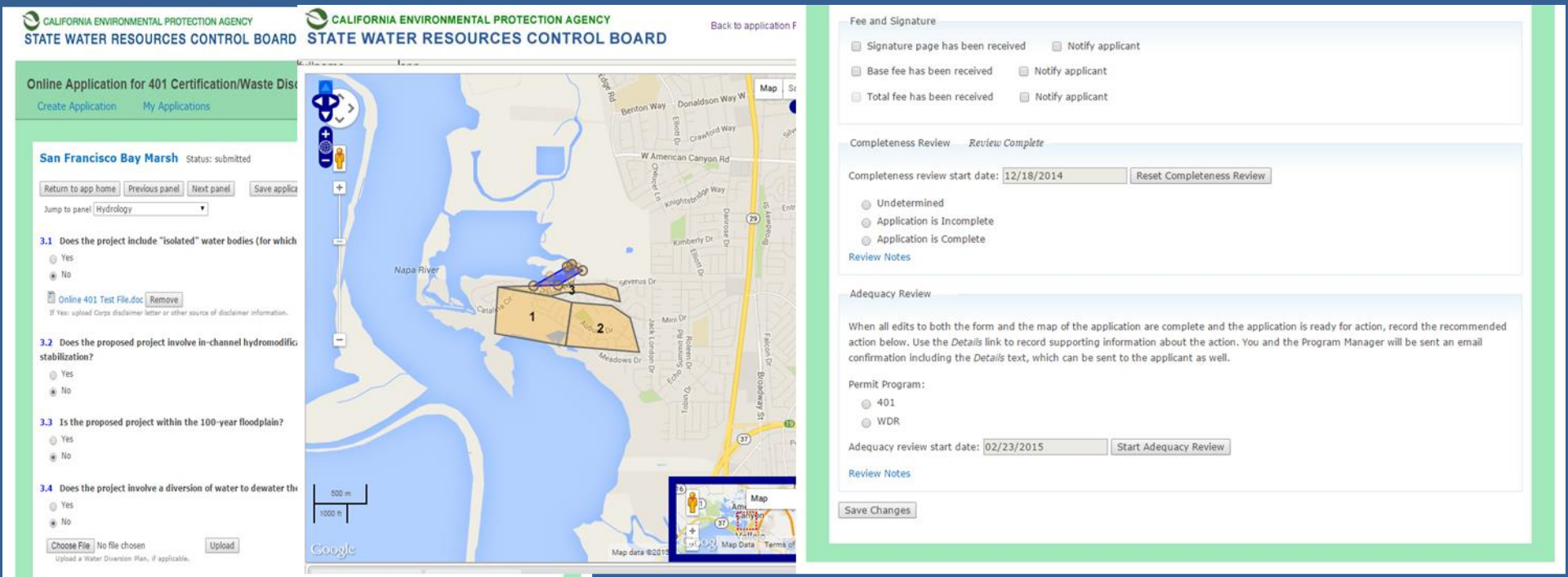




Tracking Tool :: Online 401 Application

Features

- Standard web-based data entry forms
- Interactive mapping tool
- File repository
- Project management and tracking tools
- Shared environment for applicant and line staff



Watershed-based Decision Support

:: Visualization Tools

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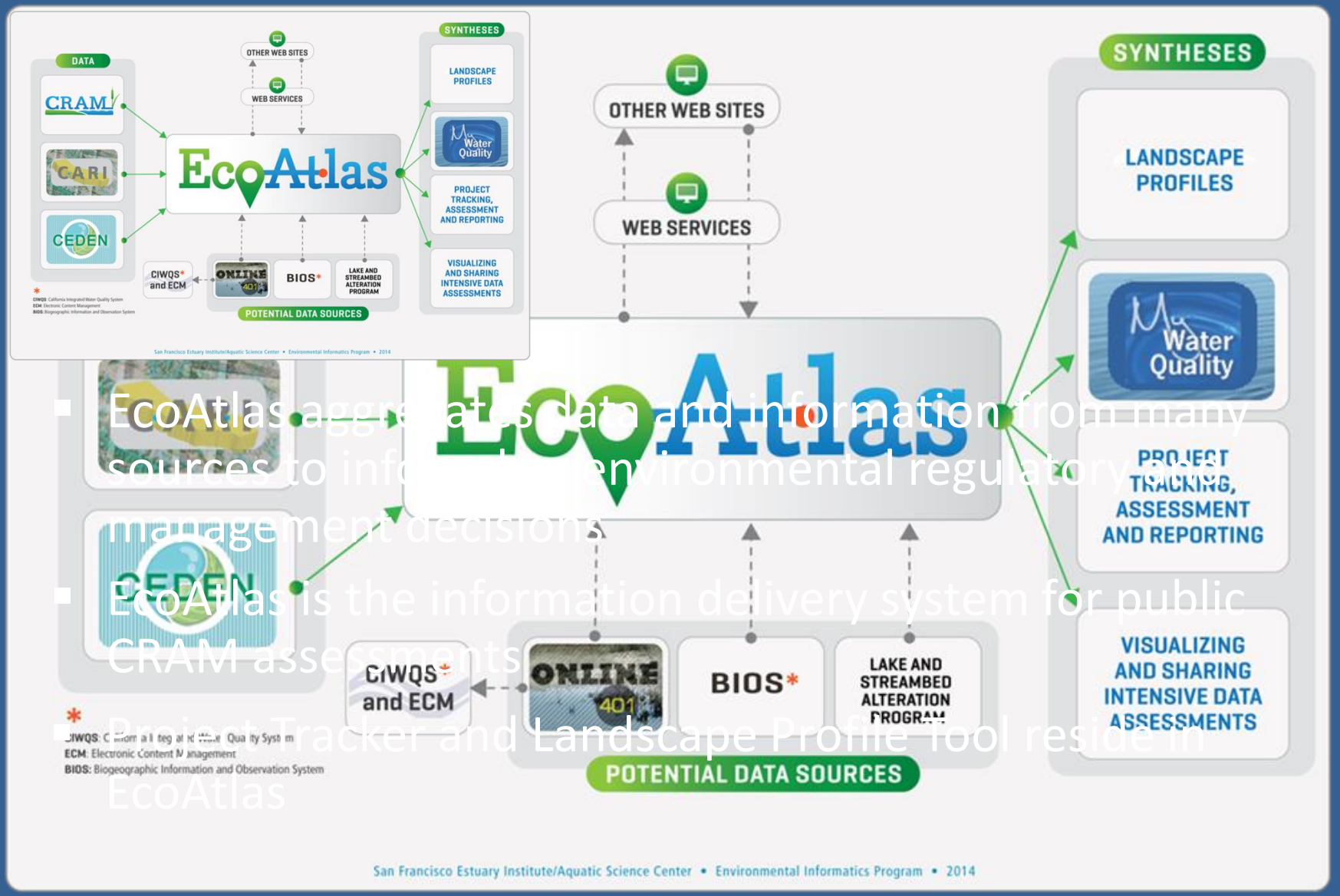
Visualization Tool :: EcoAtlas Information System

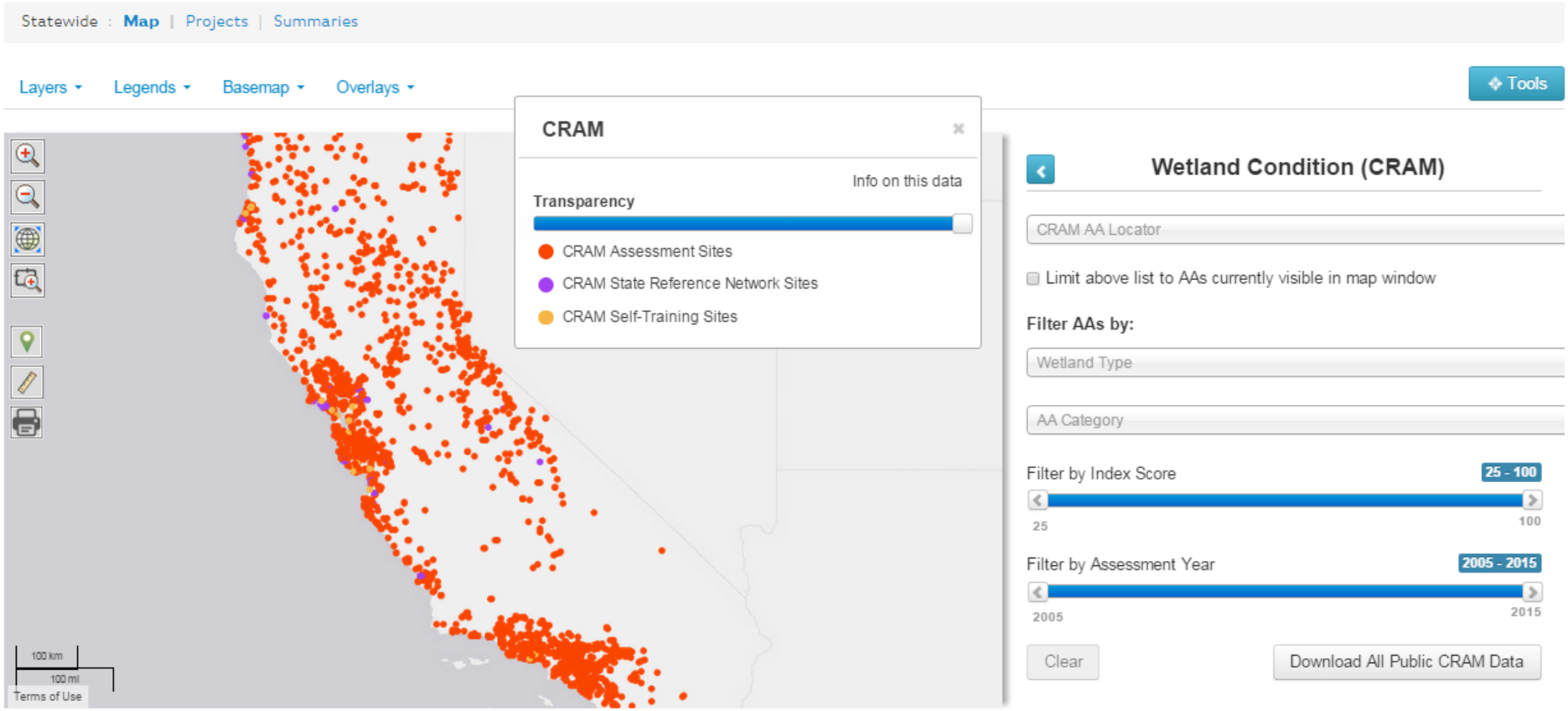


- EcoAtlas aggregates data and information from many sources to inform [illegible] environmental regulatory and management decisions
- EcoAtlas is the information delivery system for public CRAM assessments
- Project Tracker and Landscape Profile tool reside in EcoAtlas

Visualization Tool :: CRAM Tool

Purpose

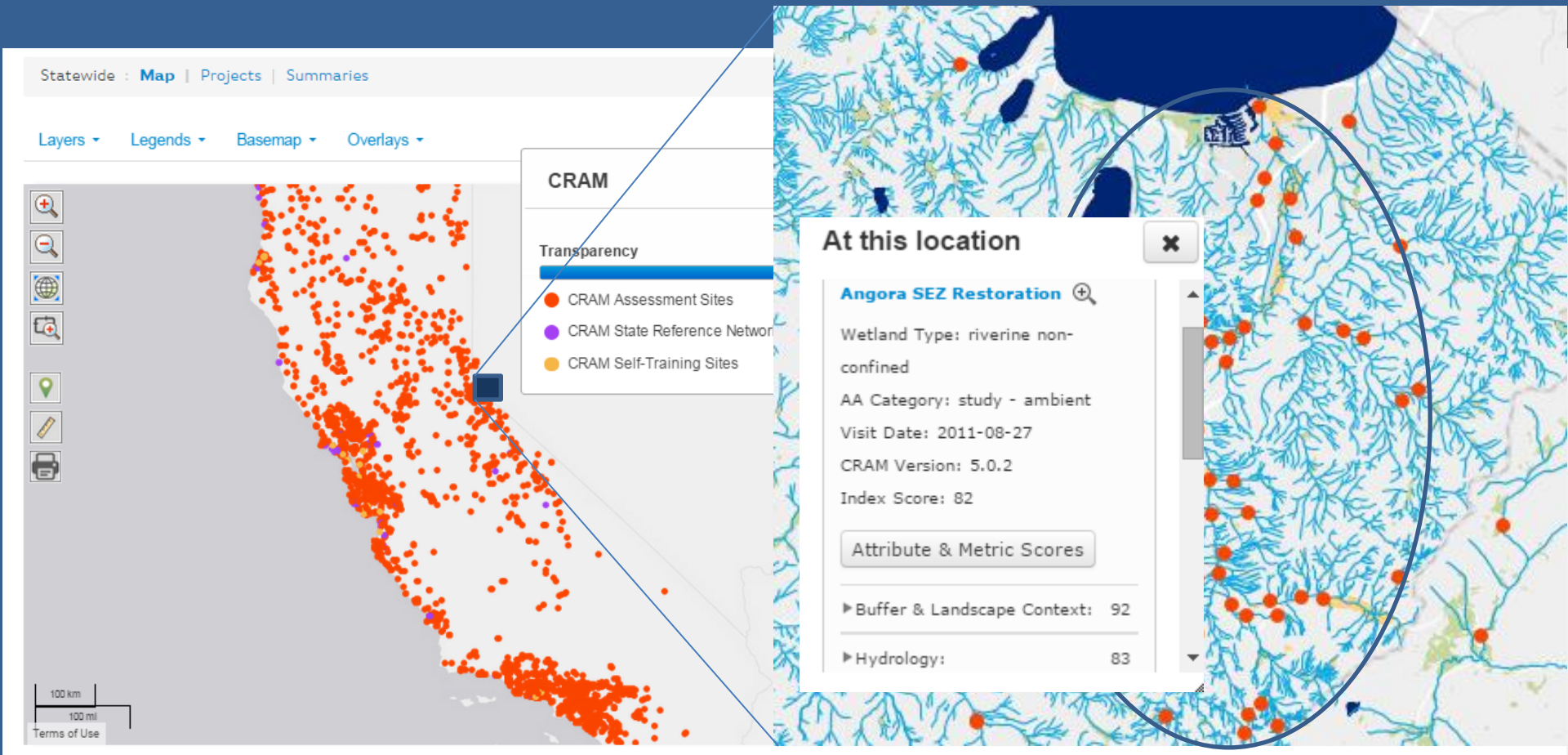
Visualize and download wetland condition data for ambient and project surveys, and reference sites



Visualization Tool :: CRAM Tool

Features

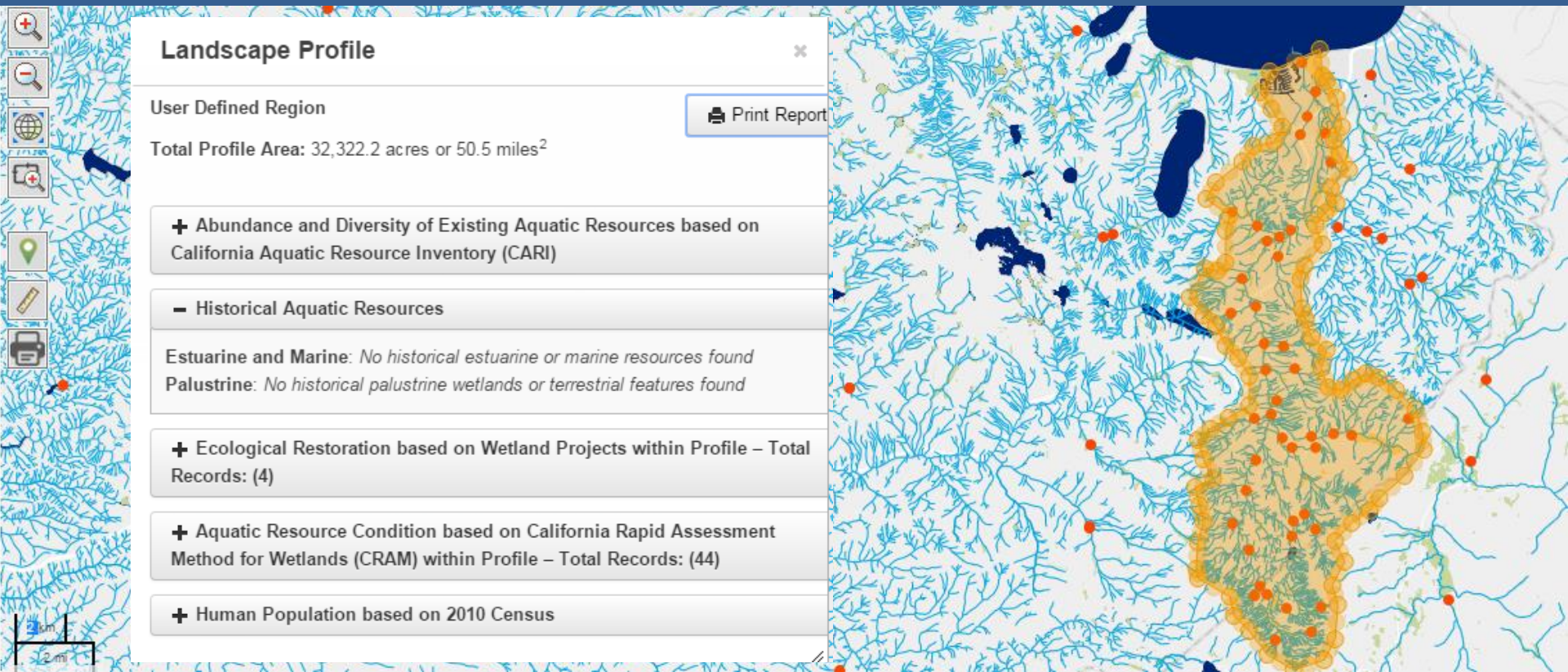
- Query CRAM assessment data
- Access details on index, attribute and metric scores
- Download data as tabular or spatial file (shapefile or KML)



Visualization Tool :: Landscape Profile Tool

Purpose

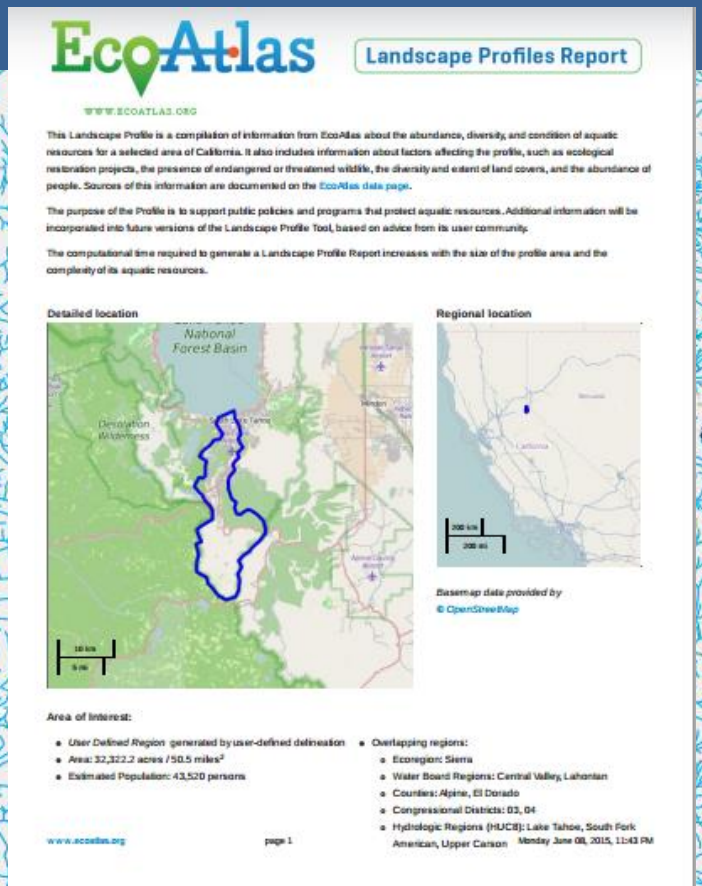
Aggregate different data sources for area of interest



Visualization Tool :: Landscape Profile Tool

Features

- Summarize information for user-defined watersheds
- Generate custom maps and graphs
- Download PDF summary report



EcoAtlas

Landscape Profiles Report

WWW.ECOATLAS.ORG

This Landscape Profile is a compilation of information from EcoAtlas about the abundance, diversity, and condition of aquatic resources for a selected area of California. It also includes information about factors affecting the profile, such as ecological restoration projects, the presence of endangered or threatened wildlife, the diversity and extent of land covers, and the abundance of people. Sources of this information are documented on the EcoAtlas data page.

The purpose of the Profile is to support public policies and programs that protect aquatic resources. Additional information will be incorporated into future versions of the Landscape Profile Tool, based on advice from its user community.

The computational time required to generate a Landscape Profile Report increases with the size of the profile area and the complexity of its aquatic resources.

Detailed location

Regional location

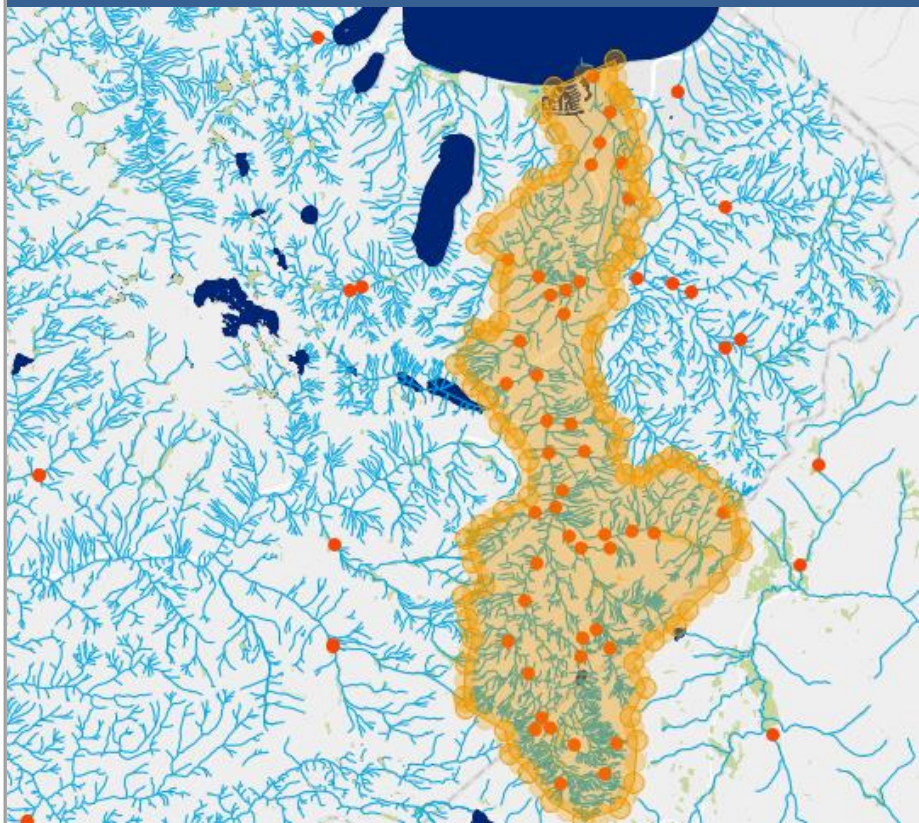
Basemap data provided by © OpenStreetMap

Area of Interest:

- *User Defined Region* generated by user-defined delineation
- Area: 32,322.2 acres / 50.5 miles²
- Estimated Population: 43,520 persons

- Overlapping regions:
  - Ecoregion: Sierra
  - Water Board Regions: Central Valley, Lahontan
  - Counties: Alpine, El Dorado
  - Congressional Districts: 03, 04
  - Hydrologic Regions (HUC8): Lake Tahoe, South Fork American, Upper Carson

www.ecoatlas.org page 1 Monday June 08, 2015, 11:43 PM



Watershed-based Decision Support

:: Possible Implementation Phases

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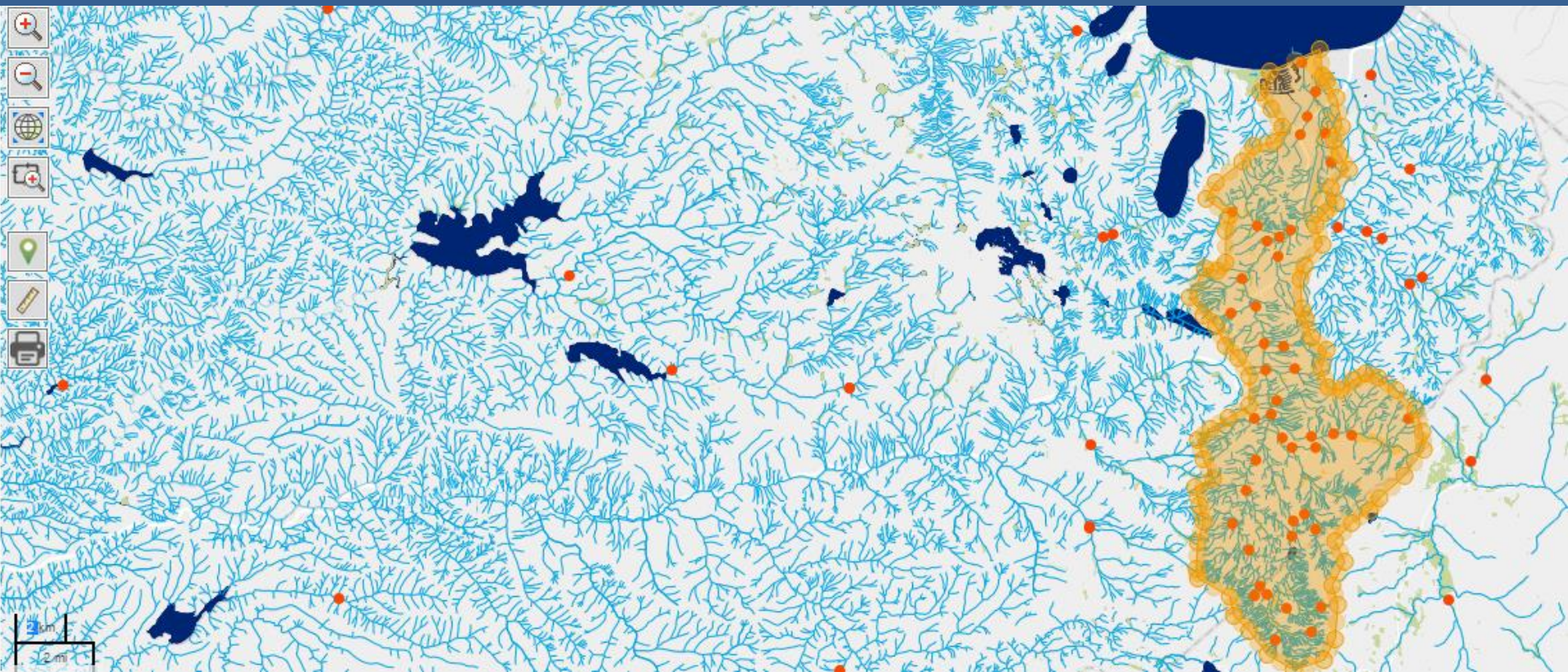
Implementation Phases :: Planning Tools

Base map

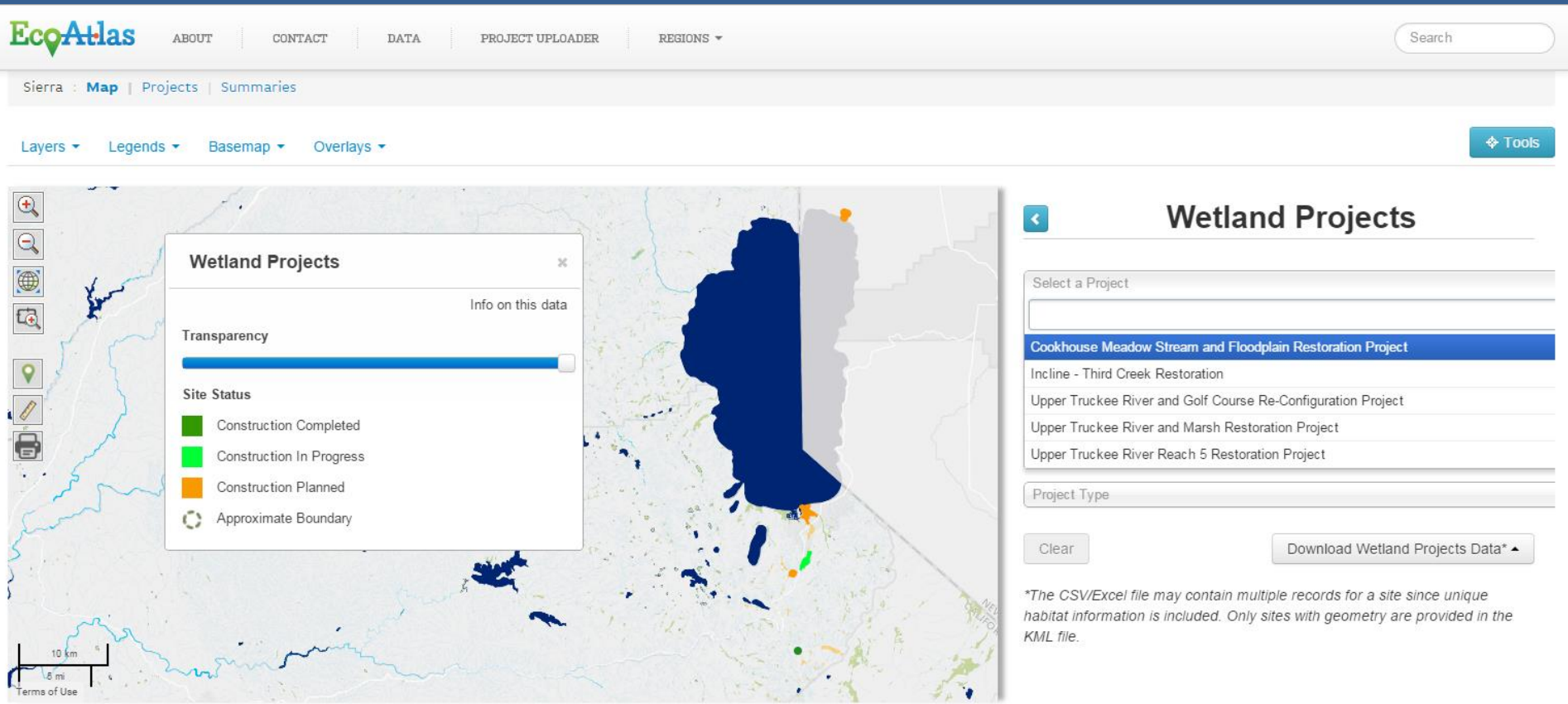
- Add SEZs to TARI/CARI
- Local revisions using the online Editor Tool



Implementation Phases :: Tracking Tools

Project Tracking

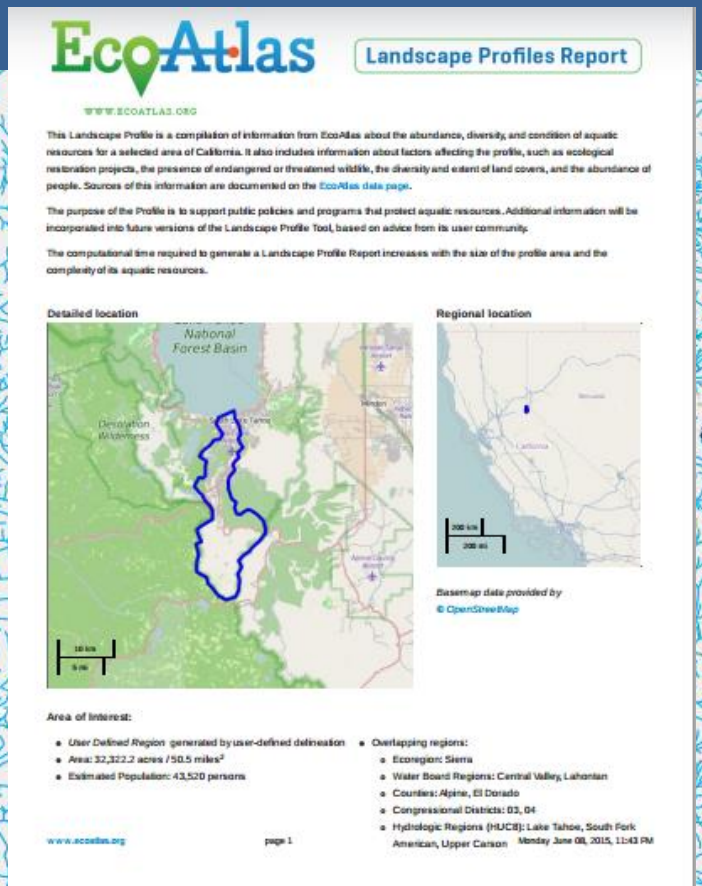
- Upload more projects *(through Online 401 or just Project Tracker)*
- View projects on map of surface waters
- Expand tracking to include stormwater projects



Implementation Phases :: Visualization Tools

Landscape Profile Tool

- Visualize planning in watershed context
- Establish link between EcoAtlas and EIP Reporting Tool
- New funding! Alternative mitigation site comparison



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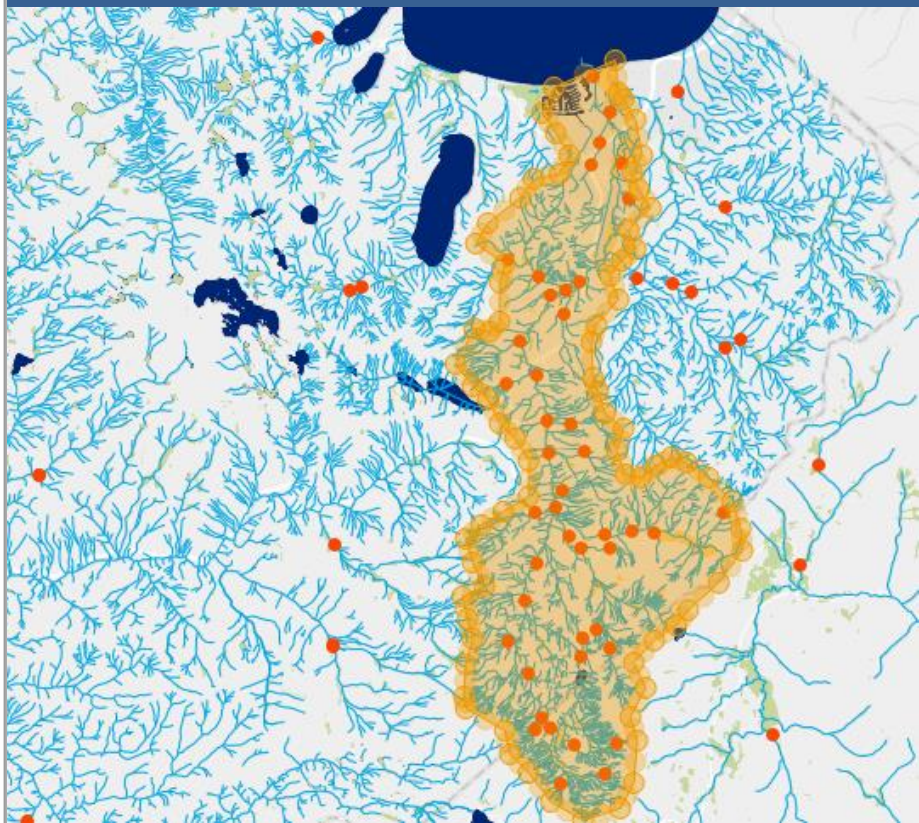


Thank You

Cristina Grosso

cristina@sfei.org

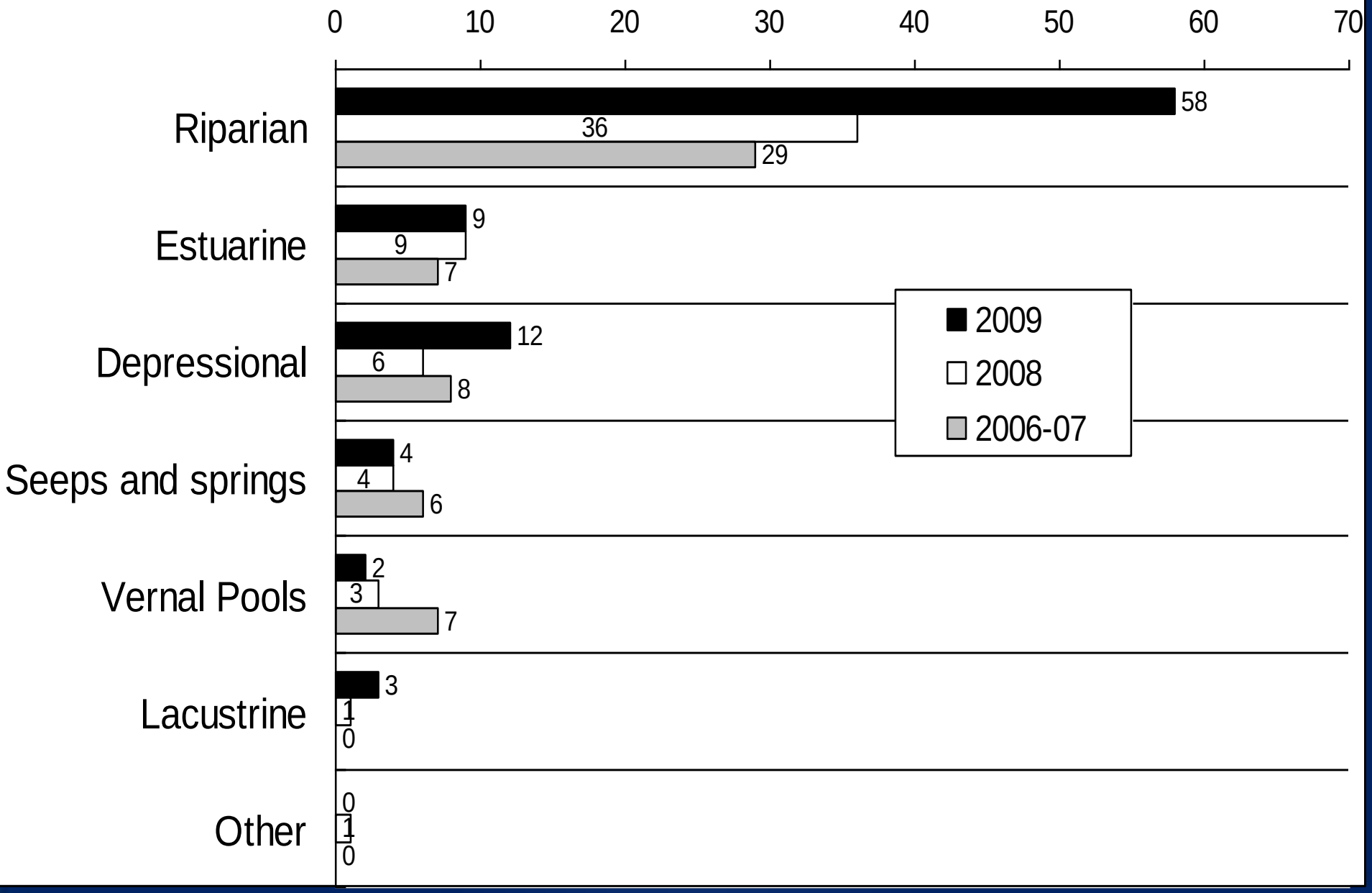
Item 11 (4)
Tools for Wetlands and Streams Protection

Shin-Roei Lee, AEO
North Coast Water Board
July 9, 2015

Outlines

- Program management
- Project management
  - Single project during application stage
  - Multi-projects after being certified
- Conclusion

Figure 6. Number of impacted habitats in 2009, 2008, and 2006-07



Program Management Priorities

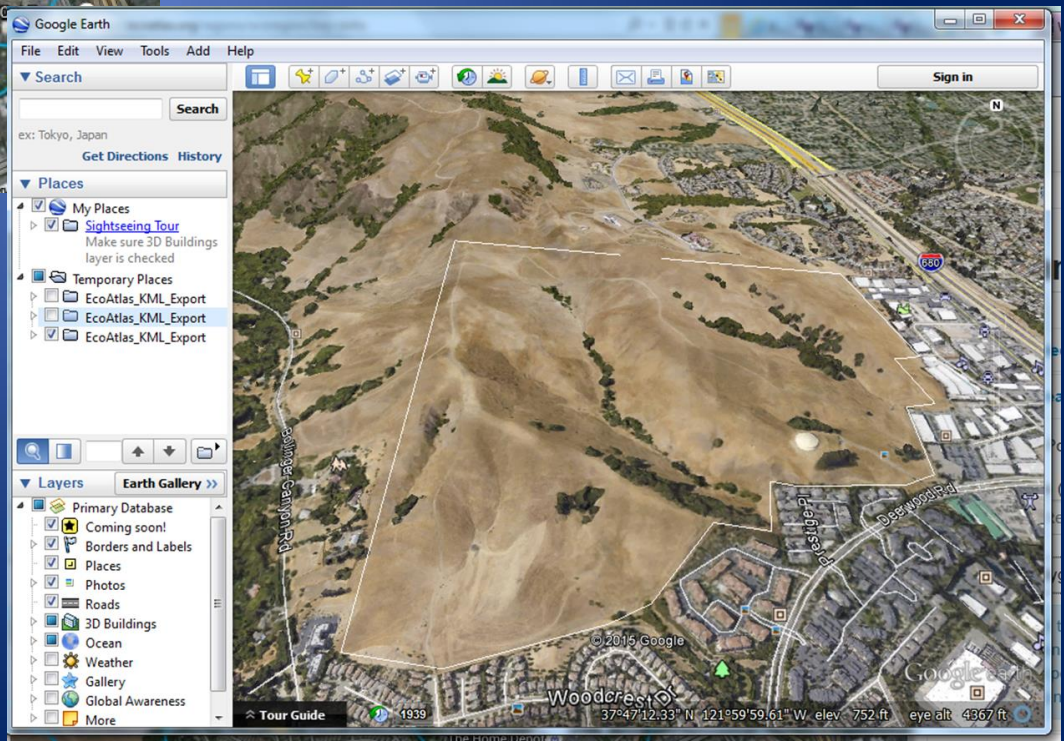
- Developed multi-year permits for maintenance activities
- Emphasized Avoidance and minimization of impacts to riparian systems
- Continued to Analyze data to detect if trends continue or change
- Informed policy development

Application Completeness Review

City's 2002 Specific Plan

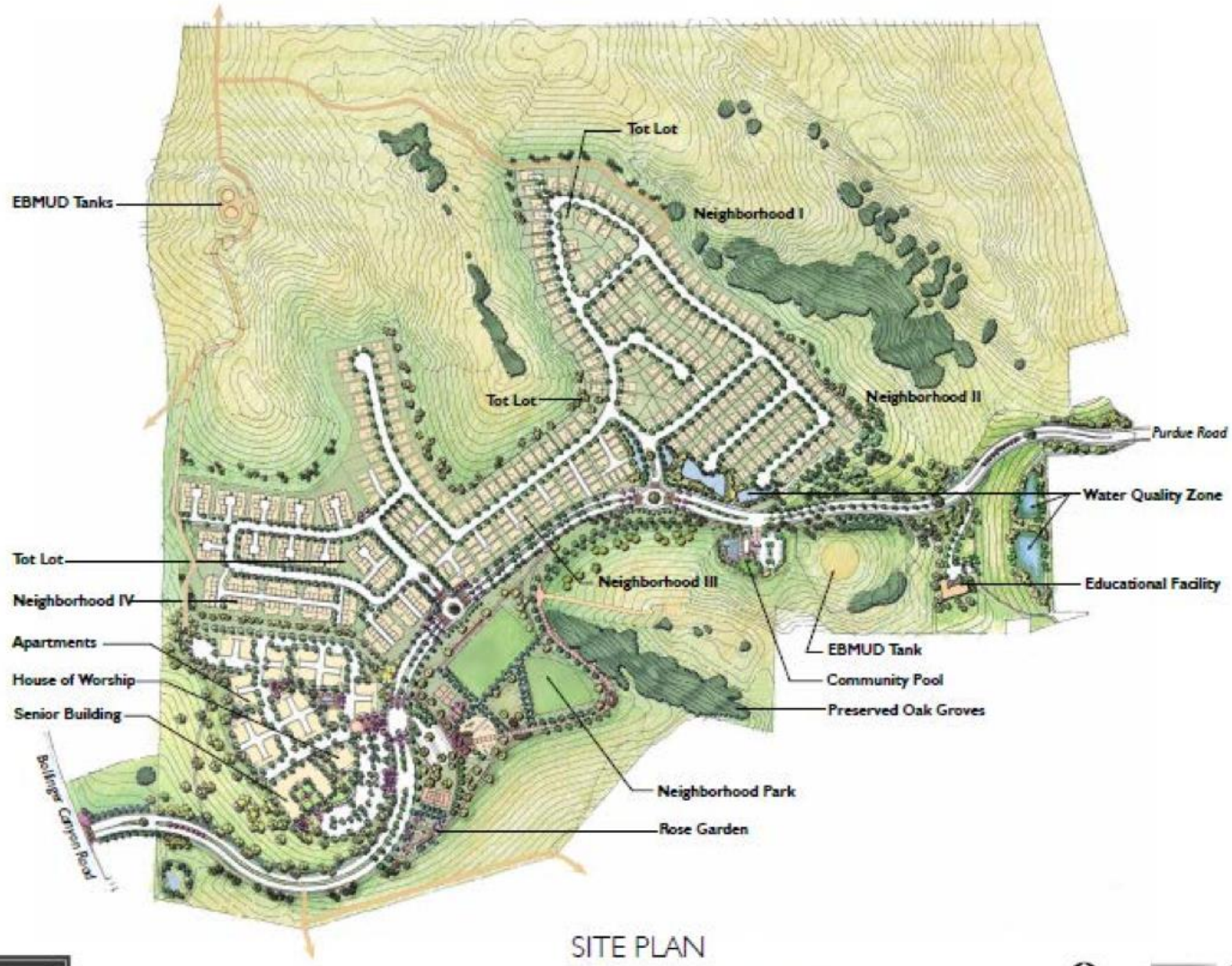
EcoAtlas Map

Google Earth Map



Background: 2006 Approved Faria Project

Project Site Plan



SITE PLAN

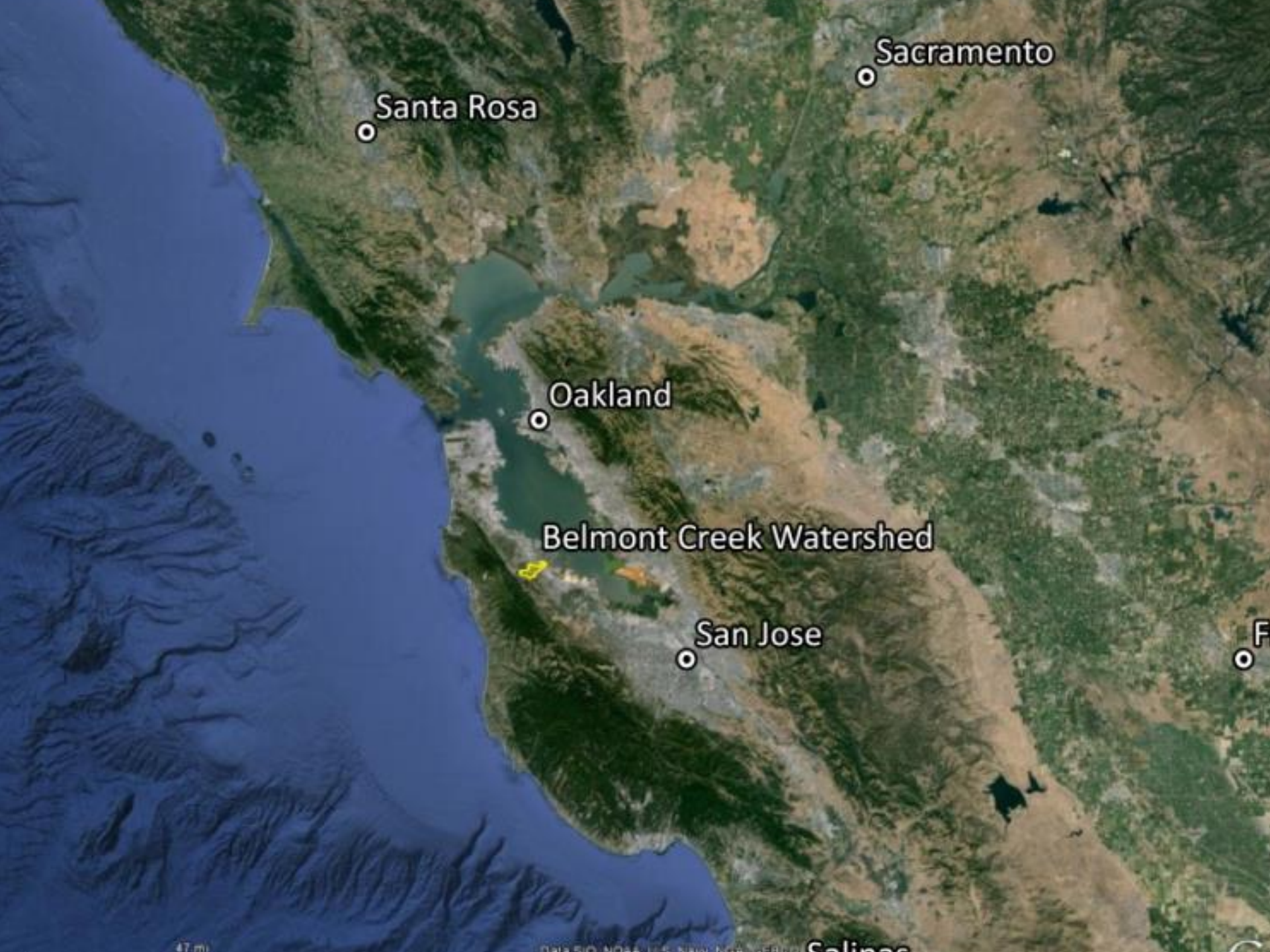
FARIA PRESERVE

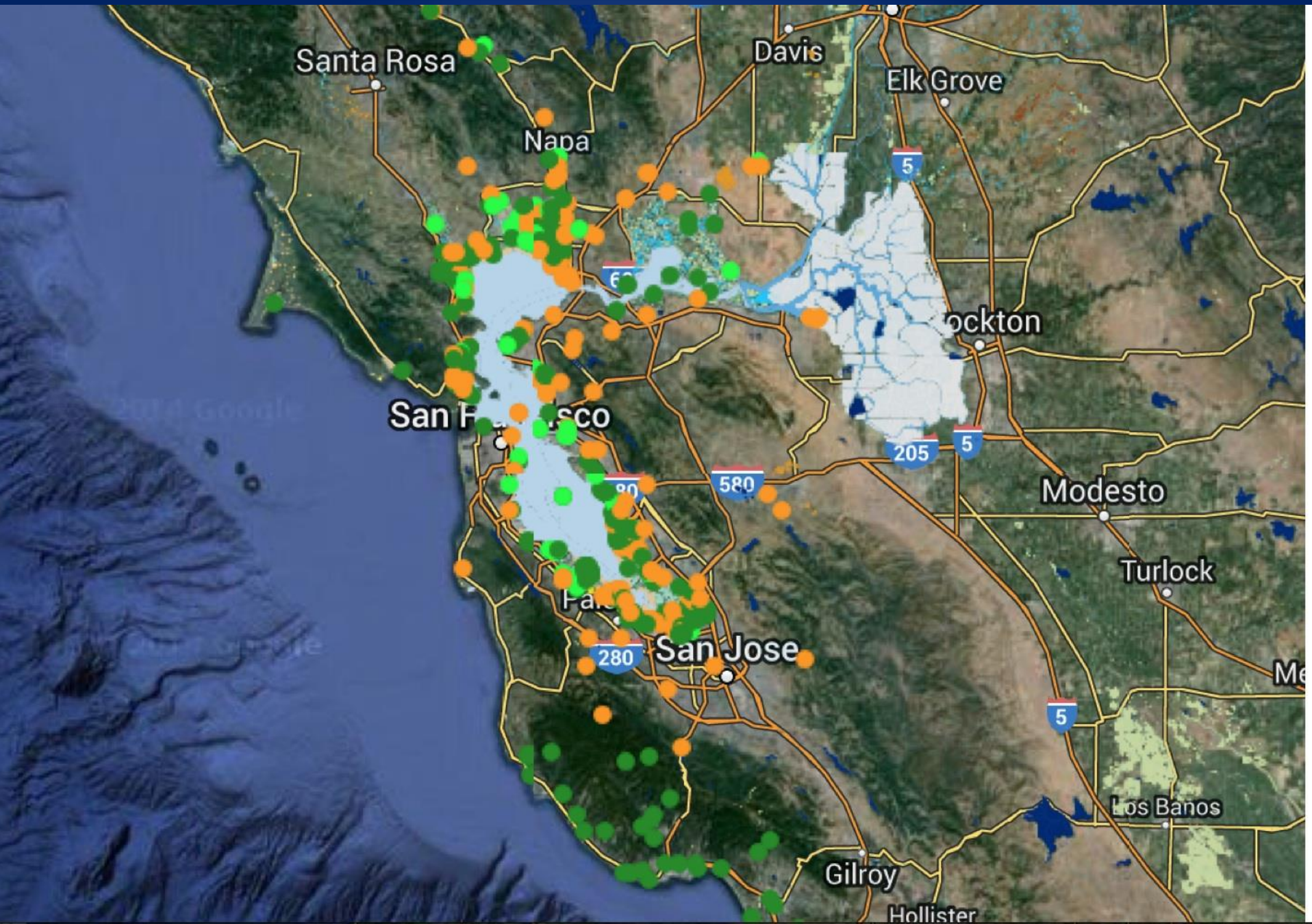
LAFFERTY COMMUNITIES

GATES +ASSOCIATES

MARCH 2014

Tracking, Planning and Visualizing Current and Future Projects


Sacramento
Santa Rosa
Oakland
Belmont Creek Watershed
San Jose


Santa Rosa
Davis
Elk Grove
Napa
5
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San F sco
205
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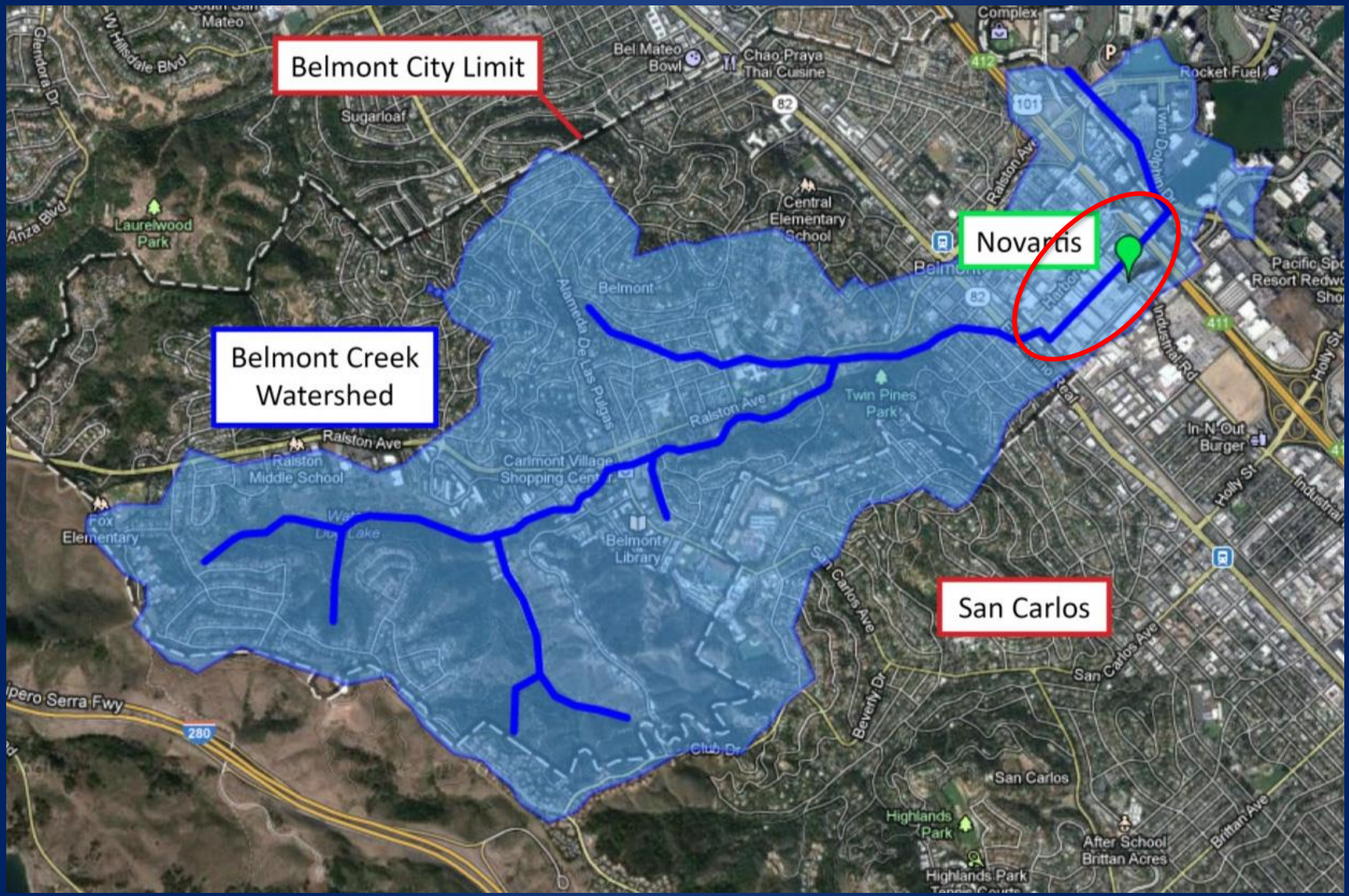
580
Modesto
Turlock
280
San Jose
5
Los Banos
Gilroy
Hollister

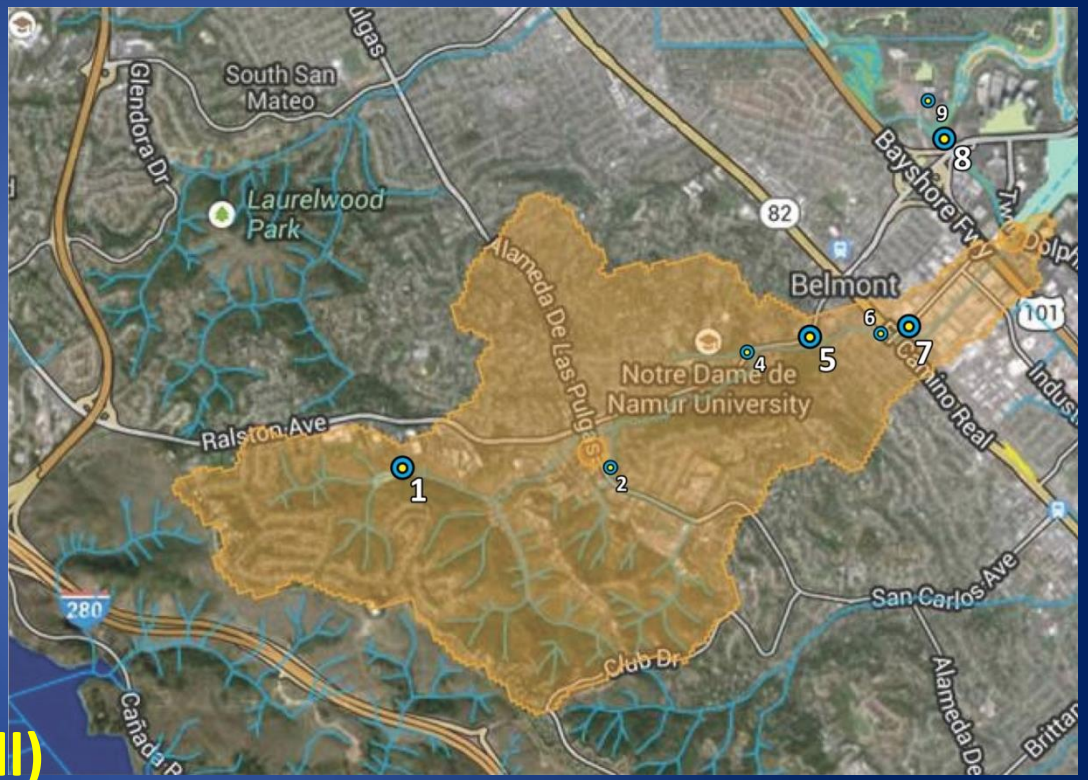
Belmont Creek Watershed



Sediment Removal Sites

Watershed Study

1. **Dam modification**
2. Detention basins
3. **Regional LIDs**
4. Creek daylighting
5. **Creek restoration**
6. New culvert with green street
7. **Floodwalls**
8. **Tide gate and pump (small)**
9. Tide gate and pump (large)



www.EcoAtlas.org


Creek Restoration Site

Benefits

- Tool for board manager and staff in program and project management
- Tool for local entities in making land use decisions
- Tool for project proponents on project planning and permit applications

Questions?